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INDIA RUBBER WORLD

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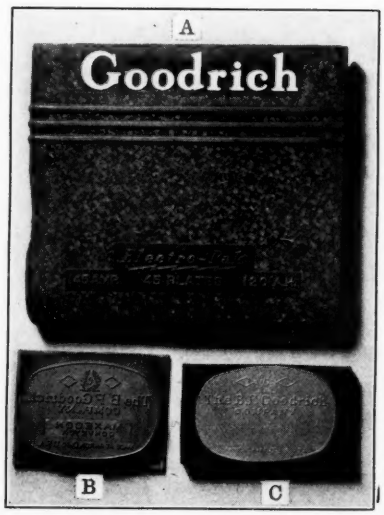
Methods of Rubber Product Identification

E. A. Sprigg[1]

MAJOR developments in the chemical and mechanical field leading to the extensive commercial uses of rubber and allied products have been recorded faithfully by those men intimately concerned with such achievements. Volumes have been written upon the chemical operations of rubber, rubber compounding and mechanical equipment for handling and working rubber materials. In all of these works few, if any, words have been placed on paper regarding the methods by which the infinite number of rubber products have been identified as to the maker, the product name, the date of its manufacture, and similar information. Such identifications are known to the rubber industry as brands, and their type, development, and methods of application are as varied as the rubber products to which they are applied.



A: **Battery Case Molded Impression Brand; *B:* Steel Impression Die; *C:* Colored Impression Brand, Applied after Vulcanization**

The opportunity to establish a definite date for the application of the first brand to a rubber product is nearly impossible owing primarily to the fact that early records of rubber workers carry no mention of their branding or marking methods. For the sake of establishing a starting point upon which to base this record of brands, methods of application, and materials from which they are made, it is safe to assume the earliest brands were applied by Thomas Hancock to rubberized fabrics manufactured for Macintosh & Co. This first branding date is therefore assumed to be the year of 1825, inasmuch as it was during this year that Hancock completed negotiations with Macintosh & Co. and furnished the latter concern with rubber products printed with his name.

***Top:* Aluminum Impression Brand with Thin Coat of Rubber; *Lower Three:* Aluminum Impression Brands Showing Various Letter Sizes**

Engraved in Mold

During 1846 a patent was granted Thomas Hancock covering the vulcanization of rubber in molds, plates, or forms and impressions from engraved plates. From the endless variety of productions from this patent comes the so-called molded impres-

[1] Technical department, B. F. Goodrich Co., Akron, O.

sion brand, which is known to all manufacturers of rubber products and is one of the principal branding methods. The brand is an integral part of the mold, and is stamped or engraved upon one or more of the rubber molding surfaces. In the mold all lettering appears backwards and shows on the finished molded product in the correct reading order. In molded brands the lettering appears in a raised position, and its readability is dependent upon the variation in light reflecting surfaces. In the case of molded hard-rubber battery boxes the raised lettering is sometimes colored by coating with a contrasting color, using a rubber coating roll to deposit a film of ink upon the surface of the letters. Such brands are outstanding, especially in the case of white letters against a black background.

The majority of molded rubber goods manufactured today is identified as to product name, manufacturer's trade mark, and, in some cases, the method of using the article, by the molded brand. All molded rubber products upon which a brand is created during the process of vulcanization are said to be branded during cure.

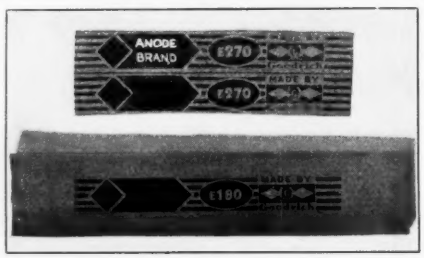
Embossed Metal Brands

An offshoot of the molded impression brand is the aluminum impression brand. There are two types of aluminum impression brands. One is stamped from thin aluminum sheets of varying thicknesses. The second type is stamped from aluminum sheets upon which a thin coating of white or colored rubber has been calendered on one side; the thickness of both the aluminum and rubber varies between twelve and twenty thousandths of an inch. After stamping, the brands are die cut from the sheets to the shape of the brand required with either powered or hand-operated cutting dies.

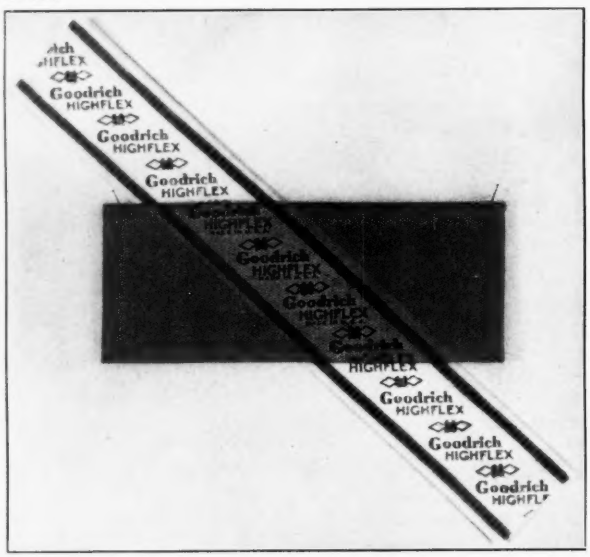
Equipment necessary for the manufacture of aluminum impression brands includes a powered stamping press, steel female dies with the necessary lettering, border lines, or trade mark engraved upon the impressing surface, and cutting dies of the shape of the brand required. The stamping dies are usually of one-inch high-grade steel stock with the design stamped or engraved on the surface in one or more positions. Often master dies are prepared with recesses cut in the stamping surface allowing for steel engraved inserts to be placed in the die. In such cases the master die usually bears the manufacturer's name and address; while the product name is carried on the insert. Inserts are also used in connection with master dies to show serial numbers as well as various date codes of the manufacturer.

Plain aluminum impression brands are used for identifying such items as rubber-covered conveyer belting, "V"-type and flat fan belts, rubber-covered hose, and an ever-changing line of molded rubber products. Transmission belting and various types of hose manufactured for industrial uses are marked with aluminum rubber-coated impression brands, the rubber coating offering a distinct color contrast to the article to which it has been applied. Products branded with either type of aluminum impression brands are also classed as branded during cure.

Printed Brand Applied to Fabric with Rubber Stamp and Fluid Ink



Anode Brands



Parchment-Paper Strip Brand—Two Colors

Pyrographic Branding

Considerable quantities of conveyor and transmission belting as well as various types of hose are manufactured and warehoused unbranded. These are known as stock items, and special brands are applied to them according to customer's requirements. The application of identifying brands to cured rubber products has been advanced by the adoption of a combination color-impression brand. This type of brand is another step away from the original molded impression brand in that it is applied after the rubber has been vulcanized. A thin steel female die bearing the necessary lettering engraved or stamped in the impressing surface is electrically heated and applied under pressure to the surface of the product to be branded. The temperature of the die is thermostatically controlled, and excellent impression brands are obtained after few minutes' contact. The impression brand so created is then coated with a suitable contrasting color by means of brush or air-spray gun. There are several variations of the method of applying impression brands to vulcanized rubber products, each type of product requiring a slightly different approach. The method outlined, however, is basic as to general procedure.

With the advent of the construction of transmission belting in slab form and subsequent slitting of the vulcanized slab to the required belt width, the need of a brand which could be used to identify each belt cut from the slab became apparent. Such a brand would of necessity be one with a constant repetition of the identifying name or trade mark, so spaced as to allow for its complete appearance on any width belt cut from the slab. First slabs of transmission belting were branded with aluminum strip brands coated with rubber cement, which were laid

across the width of the slab and cured-in. These were later replaced with a Holland-rubber strip brand, developed to overcome objectionable features of the aluminum-rubber cemented brands.

Color-Coated Die-Cut Paper Brand

Paper Brand Printed with Rubber Ink

Raw Rubber Brands

Rolls of Holland cloth, varying in width from ten to twenty inches were imprinted with the brand design in reverse order, using a special transfer ink and dusting with metallic powder before drying. A thin sheet of rubber was calendered over the printed design, and the roll cut into the desired brand size. These brands were moistened with suitable solvent or coated with cement and applied, rubber-coated side against the product to be branded. In some cases the Holland was stripped from the brand before cure, leaving the brand design indelibly imprinted upon the rubber strip; while other products were vulcanized before removing the Holland. The principal objection to removing the Holland before vulcanization is the tendency of the ink impression to transfer to the platens of the vulcanizing press. Holland-rubber strip brands are still used in considerable quantities although they are rapidly being replaced by better and more economical branding methods.

While impression brands applied to rubber products are considered most durable of all brand types, they are quite limited in the matter of color combinations. Brands of the present day require contrasting colors to attract attention, and brands as well as all other mediums of advertising are being subjected more and more to decorative colorings. As an answer to the demand for more durable and colorful labels, Anode brands have been developed and adopted.

Anode Labels

Anode brands can be classed as a semi-cured all-rubber product. They are produced by an electrolytic deposition of latex upon a previously prepared zinc plate. This electrolytic deposit of latex forms the lettering or design of the brand, and is superimposed upon a thin contrasting colored rubber sheet, the whole subjected to a semi-vulcanization process and finally cut into the required brand size.

The preparation of zinc plates for use with the Anode process has for some time been an expensive process. Recent improvements in plate preparation have been instrumental in paring down plate preparation costs.

Anode brands are very permanent as to color, but are prone to follow the flow of uncured rubber in the case of molded products with a resultant lettering or design distortion. However in the majority of Anode brand applications their appearance and ability to withstand severe abrasion more than offset any disadvantage of distortion.

Within the last few years several innovations have led to the adoption of entirely different methods of applying brands to both vulcanized and unvulcanized rubber products. Chief among these is the parchment paper strip brand printed with rubber ink.

Decalcomania

Rolls of special-grade parchment paper varying from ten to twenty inches in width are printed and slit to required brand size on a combination printing press and paper slitter. The parchment paper is printed in rolls 50 to 100 yards in length, and the printing is done in such a manner as to repeat the brand design throughout the entire length of the roll. Brand designs may be printed in one or more colors at the same time, and the rolls can be slit to any required width. The impression of the design is made from zinc etchings or electros, and the rubber ink used in connection with the printing of parchment paper transfer brands is one of the modern developments of rubber chemistry.

Parchment paper brands are applied to rubber products by means of specially designed roll holding clips which allow the vulcanizing press operator to apply automatically a brand to the rubber product being vulcanized without further preparation for the branding procedure. The development and use of parchment-paper rubber-ink brands can be totally credited to The B. F. Goodrich Co., Akron, O., which pioneered this method of product identification.

Parchment paper brands printed with a grease base ink and used in connection with the branding of inner tubes have become a common procedure among the major rubber manufacturers. This is another type of transfer brand, but it has the objectionable feature of dusting, i.e., the brand is readily smeared because of the release of the pigment binder under temperatures of vulcanization.

A further development of parchment-paper rubber-ink brands has been recently made with the offering to various users of large quantities of transmission belting of the feature of applying their trade name or trade mark printed in three, four or more colors to the belting which they use. The application of these brands is very flexible in that they may be applied either before or after the belting has been vulcanized. These brands are printed by a color lay process with rubber inks of permanent color. Vulcanization effects a permanent bond to the rubber product to which they are applied. The widespread use of parchment-paper rubber-ink brands has improved the appearance of the labels on various rubber articles and made them outstanding as to variety of attractive colors displayed.

Direct Printing

Direct imprinting of brand names, manufacturer's name, and similar markings on vulcanized rubber products is the field of greatest activity. Direct imprinting is economical and, in most cases, has proved to be the least expensive method of applying a trade mark or brand to a manufactured article. It does, however, have its disadvantages, one being lack of durability, especially when the rubber article which has been printed direct is subjected to various flexing and scraping actions. Printed brands will not wear well under excess abrasive conditions and have the adverse faculty of disappearing entirely when violently rubbed. The trend, however, is more and more to direct imprinting of all types of rubber products, and to further this endeavor various printing presses of special design have been developed to allow for printing on odd shapes and uneven surfaces. Rubber balls are now printed on special presses, as are "V"-type and flat

fan belts, transmission belting, asbestos rubber packing, airplane deicers, and other products too numerous to mention. In practically all cases where the rubber article is directly imprinted, rubber ink is used for this purpose, actual tests having shown its superior adhesion and abrasive-resisting qualities.

Indirect Printing

A branding method for molded rubber articles, developed during the past few years, has made use of thin rubber strips upon which the brand name and similar reading matter has been printed using an ink containing pigments which retain their color when exposed to vulcanizing temperatures. Usually these brands are semi-cured, and a coating of rubber cement is necessary to maintain adhesion between the brand and the goods prior to vulcanization. Practically all brands which are made on a thin rubber sheet base lack permanent adhesion qualities. This factor is due in a large measure to the difference in the compound used in making the brand and the compound of the article to which it is applied.

Die-Cut Paper

The increased use of paper, as a working base for creating brands on rubber products, is effectively demonstrated by the recent development of a color-coated die-cut paper brand. This brand creates a raised letter or design of the rubber stock to which it is applied, against a colored background. The paper used is a heavy stock varying from five to fifteen thousandths of an inch thick and so treated as to resist any adhesion between the paper and rubber during the process of vulcanization. The principal use of this type of brand has been found by the identification of the manufacturer's label in connection with heavy rubber-covered conveyer belting.

The progressive changes in the methods of branding various articles manufactured of rubber can be classified according to available records as follows:

1825. Printed brand applied to fabric prepared for Macintosh & Co. for manufacture of raincoats.

1846. Molded rubber products patent by Thomas Hancock included moldings from engraved metal such as molded impression brands.

1847. Thomas Hancock granted patent for printing patterns in various colors on elastic webbing.

1855. Book by Charles Goodyear, "Gum Elastic," reproduced with molded hard rubber cover panels. Copy of this book now in possession of Smithsonian Institute, Washington, D. C. Molded impression type brand.

1855-1900. Evolution of brass impression brand. First die-stamped metal impression brands were made from thin sheet brass.

1900. Brass die-cut stencil used for branding rubber-covered conveyer belting. These brands created a raised letter embossing on the belt. The same brand was used in making all impressions of one lettered design. Brand applied to belt before cure. Brass stencil brands averaged 1/8-inch thickness. Still used for certain types of rubber-covered conveyer belting.

1910. Aluminum replaces brass for die-stamped impression brands. Early brands were calendered with thin coat of rubber. Later rubber coating was discarded in favor of brushed coat of thin rubber cement.

1925. Rubber strips and sheets printed with special ink for branding purposes. Process still in effect.

1926. Holland-rubber strip brands replace aluminum-rubber cement coated brands to alleviate difficulties encountered when aluminum brands were applied to plied transmission belting.

1930. Anode rubber brands announced as a more permanent and colorful method of labeling rubber products.

1934. Parchment-paper rubber-ink printed transfer brands developed for identification of slab-built belting.

1934. Print frame process direct imprinting of special designs and letters adopted for labeling vulcanized rubber products.

1935. New developments in application of brands to vulcanized rubber by electrically heated steel dies.

1935. Paper used for embossed color brands.

1935-36. Special printing presses developed and adopted for direct imprinting odd and various shaped cured rubber products.

"Thiokol" as Vulcanizing Agent

IT HAS been discovered[1] that certain kinds of sulphur bearing organic compounds which are not accelerators themselves will in the presence of certain organic accelerators give up sulphur in the nascent form for vulcanization and will produce vulcanized rubber of remarkable durability. Such a material is "Thiokol," made by a reaction between sodium polysulphide and ethylene dichloride.

In the presence of small quantities of a certain group of organic accelerators "Thiokol" will give up sulphur to vulcanize rubber in which the two materials are incorporated. Zinc oxide may be present to assist the reaction. The group of accelerators which have been found to accomplish this are the so-called thiurams. The proportions of "Thiokol" and accelerators are capable of infinite variation with corresponding variation in characteristics of the vulcanized rubber.

A formula is given for a soft rubber compound and one for a hard rubber compound to illustrate the different proportions needed for these two extremes:

Soft Rubber Compound

	Lbs.	Ozs.
Rubber	50	
"Thiokol"	1	12
Tetramethylthiuram disulphide		12
Mercaptobenzothiazole		4
Phenylbetanaphthylamine	1	
Stearic acid		8
Zinc oxide	22	
Clay	24	

A compound such as that given above will vulcanize in a standard testing mold and hydraulic press in 15 minutes at 278° F. to give a tensile strength of 2,800 pounds per square inch cross section. This stock, when cured for three hours at the same temperature, will still have a tensile strength of 2,200 pounds per square inch. These figures serve to illustrate the extremely broad curing range. The stock will withstand service at high temperatures, and the disintegrating action of oils and solvents remarkably well. It will not bloom.

Hard Rubber Compound

	Lbs.	Ozs.
Rubber	50	
"Thiokol"	25	
Tetramethylthiuram disulphide	2	8
Zinc oxide	5	
Magnesium carbonate	5	
Stearic acid		8
Paraffin		8
Carbon black	25	

This compound will vulcanize to a hardness of 90 as determined by the Shore Durometer in 15 minutes at 292° F.

[1] U. S. patent No. 2,040,698, May 12, 1936.

Dispersing Effect of Mineral Rubber on Fillers in Rubber Mixes

Dr. Werner Esch

THIS article by Dr. Esch, a consulting chemist of Hamburg, Germany, tends to emphasize the present-day theories regarding the use of mineral rubber in rubber compounding as practiced in some European countries and in this country. EDITOR'S NOTE.

Specific Application

IN A published leaflet on Vulkacit F[1] the following tread stock mix is recommended:

Smoked Sheet	100
Carbon Black	40
Zinc Oxide	8
Stearic Acid	2.5
Mineral Rubber	5
Sulphur	3
Vulkacit F	1.25
Total	159.75

Here the dispersive substances consist of stearic acid plus mineral rubber; these materials together give the customary 31% by volume of the fillers, zinc oxide, and carbon black, and they are so egective that this tread mix for automobile tires can even be usedfor the extrusion of very high-grade gas tubing. However if the mineral rubber is omitted from the mix, the volume of the remaining dispersing material, stearic acid, drops to only 11.20% of the combined zinc oxide and gas black; the result is that the mix without the mineral rubber is suitable for neither tire treads nor gas tubing. It is now too dry because the fillers are insufficiently dispersed. Nevertheless the difference in the total amount of organic material figured on the total mixes is very small: viz.

Without Mineral Rubber	82.28% by volume
With Mineral Rubber	82.88% by volume

In a later leaflet on Vulkacit F[2] the following mixes for rubber soling are recommended:

BLACK

Smoked Sheet	100
Gas Black	120
Zinc Oxide	10
Mineral Rubber	40
Stearic Acid	4
Kieselguhr 19	15
Sulphur	4
Vulkacit F	2
Phenyl-B-Naphthylamine	1
Total	296

In this case the dispersive materials, stearic acid plus mineral rubber, together amount to 55.46% by volume of the fillers, zinc oxide plus gas black. If the mineral rubber is omitted from this mix, the volume percentage of the remaining dispersive material, stearic acid, drops to only 5.633% by volume of the total fillers, i.e., zinc oxide plus gas black plus Kieselguhr. This compound without the addition of the dispersing material, mineral rubber, can no longer be mixed because it is far too dry and does not bind. The amount of organic material follows:

Without Mineral Rubber	59.96% by volume
With Mineral Rubber	66.71% by volume

BROWN

Smoked Sheet	100
Magnesium Carbonate	165
Magnesium Oxide (Light)	15
Zinc Oxide	10
Montan Wax	5
Red Oxide 720	5
Phenyl-B-Naphthylamine	1
Mineral Rubber	40
Kieselguhr 19	40
Sulphur	4
Vulkacit F	2
Total	387

The dispersing materials, Montan wax plus mineral rubber, together represent 43.38% by volume of the combined five fillers. If the mineral rubber is left out, the remaining dispersing material, Montan wax, is 4.903% by volume of the five fillers. The mixture becomes dry and unworkable. These data prove the effectiveness of mineral rubber as a dispersing agent.

The dispersing effect of mineral rubber is further shown by the fact that it produces better resistance to tear by the Winkelmann method, to shear by the method of Ingmanson and Gray, better abrasion resistance by the Kelly method, lower water absorption, lower permeability to gases, increased resistance to electrical breakdown potentials—in general, valuable improvements in rubber compounds. In this connection such improvements are in no sense to be regarded as the observation of some lone investigator. They are the observations of many investigators, experts in varied fields, so that the scattered data to be found in the literature regarding the useful properties of mineral rubber are quite worthy of belief.

Cases also occur in which the addition of mineral rubber to a base mix containing none produces in the vulcanizate a lower modulus, but a higher shore hardness. It is simply not reasonable to regard mineral rubber as a softener only. It is also used in hard rubber mixes as a dispersing agent, for example, in the compounds for fine combs, battery boxes, etc., thus:

Smoked Sheet	100
Plastogen	2
Mineral Rubber	0.5
Sulphur	45
Vandex	2
Total	149.5

This compound may be cured between tinfoil in hot

[1] Published by I. G. Farbenindustrie A.G., Frankfurt a.M., Germany, July, 1930, p. 4.
[2] Aug., 1934, p. 57.

water for five hours at 149° C. The small amount of mineral rubber reduces the strength of adhesion of the tinfoil to the hard rubber, which makes its removal easier; furthermore the tenacity of the hard rubber is increased by the improved dispersion of the excess sulphur.

Boggs and Wiegand[3] have shown that in a cable compound containing alkali reclaim and mineral rubber, if a portion of the zinc oxide is replaced by an equal volume of active carbon black (which unquestionably dries out more and therefore must be better dispersed than zinc oxide), improved electrical properties are obtained, owing only to the good dispersion of the volume of gas black introduced. For the sake of clarity these compounds are shown recalculated on the basis of 100 parts of rubber by weight:

Smoked Sheet	100	100
Alkali Reclaim	61.13	61.13
Mineral Rubber	48.73	48.73
Agerite Powder	1.409	1.409
Accelerator	0.2817	0.2817
Sulphur	5.353	5.353
Zinc Oxide	64.79	39.85
Active Carbon Black	.....	7.7777
Total	**281.6937**	264.5314

The volume of both mixes is exactly the same. The wetting effect of the mineral rubber on the carbon black of the second compound is so pronounced that all the electrical properties, insulation resistance, breakdown potential, power factor, and dielectric constant, are better than those of the first compound. German cable factories have for many years been thoroughly acquainted with the good properties of mineral rubber and carbon black and have applied them with success.

In itself the dispersive effect of mineral rubber has been known, but some have questioned it. Mineral rubber is one of the oldest and best media for diluting rubber and adapting it for the incorporation of increased quantities of fillers. It is made by blowing air through a properly prepared molten mixture of asphaltic base materials. During this process volatile substances are driven off with simultaneous absorption of oxygen by the remaining asphaltic material. The air is shut off as soon as the molten mass has acquired the proper consistency, and the liquid product is poured into metal drums where it is allowed to solidify. Although the manufacture requires careful supervision and adherence to definite working conditions, large-scale production keeps the cost down so that the price of mineral rubber is low and permits it to be used extensively as a cost reducer for rubber mixes.

Characteristics

Besides a suitably low-cost price the rubber technologist requires in mineral rubber quality and uniformity, easy and complete miscibility with rubber, and good aging quality of the rubber compounds. Mineral impurities, as shown by the ash content, should be less than 0.2%. In the remaining 99.8% of organic material there should be present only a very minute amount of coke-like carbon. This is insoluble in carbon disulphide and has a blackening effect like carbon black, for which reason it is particularly undesirable when small additions of mineral rubber are to be made to blue, green, and red rubber mixes for the production of deep color shades, a trick often used in American factories with astonishing effect.

To be easily and completely miscible with rubber mineral rubber should have a definite relation between its melting point and hardness (measured by the depth of penetration of a needle, hence also called "penetration.") The melting point must not be too high; otherwise lumpiness and uneven incorporation with the rubber will result. If the melting point is determined by the so-called ring and ball method, it should be about 149° C., and by the cube method (Wurfelmethode), about 157° C. If, instead of the melting point, the drop point according to Ubbelohde is measured, this will lie about 25° C. higher than the ring and ball melting point, that is, about 174° C. In this case the hardness (penetration) should not be over five. That is, the test needle with a load of 100 g. should not penetrate deeper than 0.5-mm. in five seconds. If the needle penetrates further, the mineral rubber will be too sticky and difficult to handle on the mixing rolls.

Numerous attempts have been made to interest rubber men in higher melting products in order to obtain higher tensile strength and modulus, the fact being overlooked, however, that such products tend to increase the mixing time and to produce lumpy and ununiform mixes and are therefore not serviceable. On the other hand, neither is a sticky product with too low a melting point serviceable, because in this case handling is too difficult.

The mixing of mineral rubber is usually begun by throwing the weight quantity on the open mill rolls whereby the lumpy material is broken up and converted into a friable cake. This is then thrown into the rubber or rubber and reclaim while these are being broken down. As a result of the pressure, the mineral rubber disperses easily and uniformly throughout the rubber. But if the mineral rubber is added to the softened mass toward the end of the mixing operation, the disintegrating pressure on it is then too low, and ununiform dispersion will result. By getting the mineral rubber combined with the rubber at the very beginning of mixing, the former is given ample opportunity in the course of the mixing process to dissolve in the rubber. This dissolution of the mineral rubber in the rubber facilitates the incorporation of corresponding definite amounts of fillers and their proper dispersion in the rubber.

Specific Proportions

The amount of mineral rubber to be used as determined, for example in the case of tire treads, by adding 5 kg. for every 100 kg. of rubber. If the mix also contains reclaim, 5 kg. of mineral rubber are likewise added for every 100 kg. of reclaim. It is, of course, assumed that there is no increase in the amount of active carbon black added. The following is an example of such a mixing.

TREAD STOCK

Rubber	100
Alkali Reclaim	25
Mineral Rubber	6.25
Agerite Powder	1.25
Captax	1.10
Stearic Acid	4
Zinc Oxide	9
Gas Black	40
P-33	10
Sulphur	3.40
Total	200.00

However, if the compound is required to be very pliable and tacky as is the case with friction stocks for fabrics, 5% of mineral rubber on the rubber is usually insufficient. That amount should be raised to 10%, thus:

FRICTION STOCK

Smoked Sheet	80
Brown Crepe	20
Mineral Rubber	10
Pine Tar	2
Stearic Acid	1
Captax	0.5
Altax	0.5
Agerite Powder	1
Zinc Oxide	5
Thermax	15
Sulphur	3.8
Total	138.8

(*Continued on page* 44)

[3] *Ind. Eng. Chem.*, 22, 825 (1930).

Aging Tests for Rubber Products[1]

Arthur W. Carpenter[2]

THE deterioration or perishing of rubber articles with age independent of actual wear is a familiar and, to say the least, a disconcerting phenomenon. Rubber which is strong and flexible when new becomes in time either soft and tacky or firm, short, and easily torn. In either case the changes result eventually in loss of elasticity, and the product becomes hard and brittle. Until the last decade little could be done about it, though, of course, occasionally the deterioration was very slow, and in that event some "old-timer" would be likely to display with pride a flexible product, made thirty or more years before, exemplifying his skill in compounding and manufacturing. All too frequently, however, manufacturers have been obliged to proceed with the production and sale of goods which appeared to be of fine quality when vulcanized, but which came back in a sorry state some months later. Because of the importance of the problem much effort has been devoted to attempts to learn the causes of the deterioration and to find means of preventing it. Though precise understanding of the mechanism of the chemical and physical changes involved is still lacking, substantial progress has been made. Knowledge of the conditions which affect the rate and degree of aging has been obtained, and methods for accelerating and measuring the deterioration have been developed. Discovery and use of antioxidants have made possible considerable control of the effects of many of the destructive factors and have enormously prolonged the useful life of rubber products. It is perhaps more than coincidence that widespread application of these valuable chemicals followed almost on the heels of the development by Geer[3] of the first generally accepted accelerated aging test method.

Oxidation

Before considering in detail the various accelerated tests it is desirable to discuss briefly some of the important features of the aging process itself. No attempt will be made to give a complete survey of the literature since that is beyond the scope of this paper. For such a survey the reader is referred particularly to the admirable review of Dufraisse[4] which appeared in 1932. It is now quite generally recognized that the deterioration of rubber during aging is mainly caused by oxidation of the hydrocarbon. The importance of the role of oxygen in aging of rubber seems to have been recognized first by Spiller[5], who reported in 1865 the results of experiments in which he extracted "patent water-proof felt," previously aged for six years, and demonstrated formation of a resinous film containing oxygen. About the same time Miller[6] observed that the action of air and light upon rubber causes deterioration due to oxidation.

He wrote, "Caoutchouc, like gutta-percha, is . . . liable to deterioration by exposure to the action of oxygen in the presence of solar light but the gum is less rapidly injured if exposed to their influence in the native state than if it has been previously masticated. When subjected to the action of air excluded from light, it does not experience any marked change, even during very long periods."

He also mentioned that in some insulated wire he had observed rubber which had become soft and sticky only where in contact with the copper. His studies were mainly on gutta percha and unvulcanized rubber, although he made some less conclusive experiments with vulcanized sheets.

Few other publications of importance appeared until 1883, when Burghardt[7] stated that the perishing of rubber is simply a greater or less degree of oxidation and that the percentage of oxygen present is an index of the amount of deterioration. He noted the accelerating action of light, and detected the formation of sulphuric acid in aged rubber having a sufficiently high coefficient of vulcanization.

Two years later Thomson[8] showed by exposing vulcanized rubber samples to sunlight for several months in hydrogen, carbon dioxide, air, oxygen, and in a vacuum, that oxygen is essential in the aging process, for only the samples in air and oxygen suffered any appreciable change. He found no deterioration in the other media even at the temperature of boiling water. Thomson also observed that ozonized air caused very rapid deterioration of stretched rubber thread, but had much less effect on the unstretched material. Recognizing the influence of heat, he suggested a method of oxidation accelerated by moderate temperature (66° C.), anticipating in a way the Geer test of later years. Meanwhile other workers used higher temperatures, Vladimiroff[9] 125° C. in air and Ditmar[10] 100° C. in oxygen. The latter observed that too high temperatures employed in vulcanization accelerated the rate of oxidation.

Catalytic Action

For many years the tackiness which often develops in raw rubber had been ascribed to oxidation, and bacterial action or fermentation had come to be held responsible. Bertrand[11] in 1908 took issue with the bacterial or enzyme theories, pointing out that the speed with which the effect spread, when small amounts of tacky rubber were added to large quantities of undeteriorated material, and also the accelerating effect of light on this phenomenon are incon-

[1] Paper read at meeting of Chicago Group, Rubber Division, A. C. S., Nov. 13, 1936. Published by permission of H. E. Howe, editor, *Industrial and Engineering Chemistry*.
[2] Manager, Physical testing laboratories, B. F. Goodrich Co., Akron, O.
[3] Geer, India Rubber World, 55, 127 (1916); Geer and Evans, *Ibid.*, 64, 887 (1921).
[4] Dufraisse, *Rev. gén. caoutchouc*, 9, 85, 4-10 (1932); 86, 3-21 (1932); *Rubber Chem. Tech.* 6, 157 (1933).
[5] Spiller, *J. Chem. Soc.*, 18, 44 (1865).
[6] Miller, *Ibid*, 18, 273 (1865).
[7] Burghardt, *J. Soc. Chem. Ind.*, 2, 119 (1883)
[8] Thomson, *Ibid*, 4, 710 (1885).
[9] Vladimiroff, *Ibid.*, 11, 929 (1892).
[10] Ditmar, *Gummi-Ztg.*, 20, 628 (1906).
[11] Bertrand, *Caoutchouc & gutta-percha*, 5, 1941 (1908).

sistent with these theories. He considered the tackiness more likely due to physico-chemical changes.

About the same time Spence[12] published important experimental work and explained the production of tackiness on the basis of change in physical state of molecular aggregation or in degree of molecular complexity. He also observed the markedly destructive action of small traces of sulphuric acid. The work of Bertrand and Spence was very suggestive of a catalytic change during oxidation.

During the years 1912-1914 the work of Peachey,[13] Ostwald,[14] Ahrens,[15] Kirchhof,[16] and van Rossem[17] added immeasurably to knowledge of the aging of vulcanized rubber by demonstrating the autocatalytic nature of the oxidation and the formation of intermediate peroxides. The existence was shown of an initial period during which oxidation is very slow. Following this, the reaction becomes more rapid because of the presence of oxidation products which act to hasten the combination of the rubber with additional oxygen. In studying the rate and extent of oxidation Peachey used both crude rubber containing the normal amount of resinous material and that from which the resin had been removed by extraction. He found that, while the amount of oxygen ultimately absorbed in the two cases was the same and corresponded to the formula $(C_{10}H_{16})0_4$, the rate of absorption was enormously faster with the extracted material.

In 1916 Stevens[18] began publication of the results of his extremely important work which continued for several years, relating the tendency of rubber to deteriorate with the degree of vulcanization and showing that both undercure and particularly overcure give bad aging. During the succeeding years a very large number of investigations have been reported in which numerous phases of age-deterioration have been studied, often in great detail and with high precision Merely to mention the more important publications would exceed present space limitations. It must suffice to say that the early observations which are here noted have been amply confirmed and extended.

Types of Reactions

Even though we do not know exactly how rubber deteriorates, we are quite certain today that natural aging is mainly the result of various oxidation reactions which, however, are not always the same, but may involve different mechanisms and occur at different rates depending upon the prevailing conditions. It is of interest to consider for a moment the main types of reactions involved and their possible effects in accelerated aging tests. Reactions with oxygen have been stated by Kohman[19] to appear to be of at least two kinds, one an addition and the other a decomposition. Moureu, Dufraisse, and Lotte[20] also have shown two distinct kinds of reaction: the first consisted of direct stoichiometrical addition, and the other not due entirely to the oxidation reaction, but rather to a secondary transformation, such as polymerization produced by the catalytic effect of peroxides formed by auto-oxidation and involving very small quantities of oxygen. Kohman, in fact, pointed out that 0.5% of oxygen absorbed may decrease the tensile strength of vulcanized rubber as much as nearly 50%. Reaction with ozone, however, appears entirely different from that with oxygen. In ozone the rate of oxygen absorption is much more rapid at first, but soon decreases, and less oxygen is ultimately taken up. This reaction is not autocatalytic. There is also reason to believe that oxidation at elevated temperatures may be of a different type from that at normal temperature. It would appear under these circumstances that efforts to accelerate natural aging for test purposes by merely speeding up oxygen absorption would probably result in alteration of the courses of the reactions involved under normal conditions and might be very misleading. Thus, an oxidation carried out under conditions producing extreme deterioration of physical properties in an exceedingly short time, might give no reliable indication as to the reactions which would occur normally under less drastic treatment.

The factors which affect the rate and extent of the changes in rubber products during aging have been summarized by Dawson and Porritt[21] in four groups, three of which are internal and not subject to change in a given rubber sample, while the fourth contains a number of external influences which are subject to control. These are as follows:

Group 1. *Conditions during production and preparation of the crude rubber employed,* including age of trees, seasonal state of trees, coagulants used, amount of machining, drying, and the like. These are usually of minor significance in affecting the aging of manufactured goods, although lower grades of rubber generally give products of poorer age resistance.

Group 2. *Conditions during manufacture.* These are important in their influence since they include the amount of mastication and milling, the vulcanizing technique, and the rate and state of vulcanization. The latter is very serious as overcures generally age rapidly. Mastication and milling have considerable effect on raw rubber, but much of this seems to be counteracted by vulcanization, as recently shown by Dufraisse and Viellefosse.[22]

Group 3. *Composition of the rubber.* These factors are likewise important as many substances may be present even in minute quantities which influence the stability of the rubber. The natural resins sometimes left in rubber have marked preservative action; while various mineral ingredients, softeners, accelerators, and preservatives all have specific effects, some favorable and others the reverse. Impurities such as oxidizing catalysts including copper, manganese, and soluble iron salts have deleterious effect, as do acids, particularly mineral acids like sulphuric, nitric, and hydrochloric. Some fillers carry oxygen into the rubber by adsorption or open the structure to rapid oxidation. Pigmentation, however, may often retard the action of light.

Group 4. *External factors,* including heat, light, tension, size, and shape of the rubber sample and the kind of the surrounding medium such as air, oxygen, ozone, water, chemicals, or the like. Of the external factors the effect of heat is perhaps greatest in importance because it not only acts to hasten enormously the chemical reactions of oxidation, but also doubtless changes their course and, besides, may have definite influence on the structure of the rubber itself. Williams and Neal[23] in studying the solubility of oxygen in rubber and its effect on the rate of oxidation have investigated the influence of temperature and pressure and point out that if the reaction rate doubles for each 10° C., as is usually considered the case, temperature increase from 30° to 70° C. would increase the rate 16 times. Also, if rubber oxidation is a reaction of the first order, increase in oxygen pressure from normal barometer to 300 pounds per square inch

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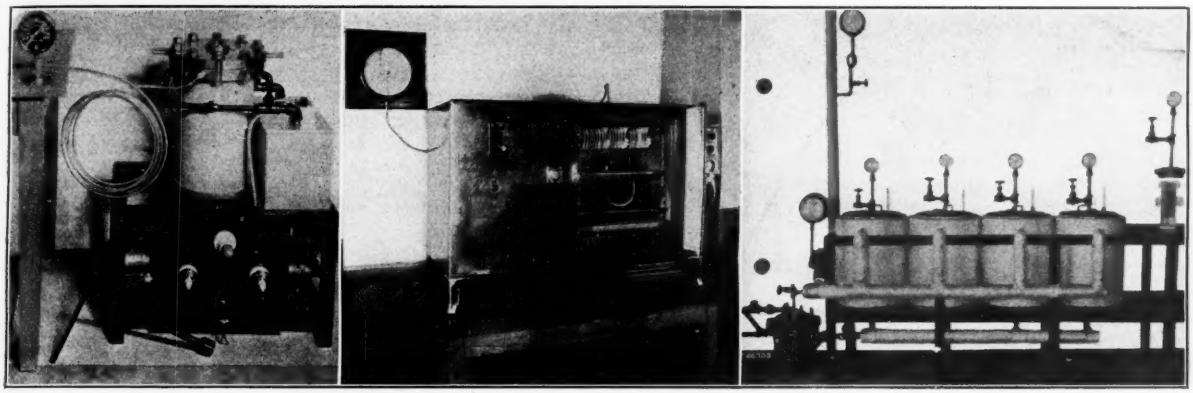
[12] Spence, *Kolloid-Ztg.*, 4, 70 (1909).
[13] Peachey, *J. Soc. Chem. Ind.*, 31, 1103 (1912).
[14] Ostwald, *Ibid.*, 32, 179 (1913).
[15] Ahrens, *Kunststoffe*, 3, 478 (1913).
[16] Kirchhof, *Kolloid-Ztg.*, 13, 49 (1913).
[17] van Rossem, "The Rubber Industry," p. 149, London, 1914.
[18] Stevens, *J. Soc. Chem. Ind.*, 35, 872 (1916); 37, 280T (1918); 37, 305T (1918); 37, 340T (1918); 38, 192T (1919).
[19] Kohman, *J. Phys. Chem.*, 33, 226 (1929).
[20] Moureu, Dufraisse, and Lotte, *Ind. Eng. Chem.*, 22, 549 (1930).
[21] Dawson and Porritt, "Rubber, Physical and Chemical Properties," p. 178, Croydon, 1935.
[22] Dufraisse and Viellefosse, *Rev. gén. caoutchouc*, 12, 114, 3 (1935); 115, 3 (1935); *Rubber Chem. Tech.*, 9, 206 (1936).
[23] Williams and Neal, *Ind. Eng. Chem.*, 22, 874 (1930).



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would still further increase the rate to 1,600 times. If, as is probable, the type of reaction changes above 70° C. so that reactions of higher orders are involved, it is easily possible that reactions proceeding at negligible rate in air at ordinary temperature may assume enormous proportions at elevated temperatures and pressures. It would appear that simultaneous use of high temperature and pressure for test purposes should be avoided both because of the possible violence of the reactions and because types of oxidation may be emphasized which at lower temperature or pressure are suppressed. The factors of light and tension accelerate deterioration greatly though the rates vary with different kinds of light and amounts of tension. These effects are, of course, well known, but Kelly, Taylor, and Jones[24] have shown that there is a critical elongation for different rubber compounds at which the rate of deterioration is most rapid. This is usually at an elongation between 8 and 15%. The factors of size and shape of the specimen which govern the ratio of the exposed surface to the volume of rubber affect the rate of oxidation by influencing rate of penetration of oxygen into the rubber mass. Kohman found that rate of oxygen absorption increases up to surface area ratios of about 40 sq. cm. per gram.

Evidence of Aging

Though the deterioration of vulcanized rubber which takes place on aging is most obvious from changes in physical properties, other evidence of degradation has been observed. The important physical signs of aging, as already noted, include hardening or sometimes softening accompanied by development of tackiness. There occurs tremendous loss of strength and elasticity. Surface cracking appears if the rubber is under strain and exposed to action of light or ozone. The weight of the material changes, usually increasing unless volatile reaction products escape. Increase of 24.5% of the original weight after eighteen months was observed by van Rossem and Dekker[25] working with a pulverized pure gum vulcanizate. The theoretically possible absorption of oxygen would amount to 47% of the weight of the rubber though serious harm is done by as little as 1% or less. The acetone extractable material increases for a time, passes through a maximum, and then diminishes, possibly because of the formation of insoluble resins by further oxidation. Many investigators have noted increases during aging in the amounts of material extractable by various solvents. Van Rossem and Dekker found the change in alcoholic-potash extract very sensitive to the initial stages of oxidation. Aldehydes and acidic substances are formed as well as peroxides, carbon dioxide, water, and sometimes hydrogen sulphide. These reaction products, too, have been determined by numerous observers including Gorter,[26] Whitby,[27] Kemp, Bishop, and Lasselle,[28] Cummings,[29] Eaton and Day,[30] and others. Finally, in all aging but particularly at elevated temperatures, the vulcanization coefficient slowly changes.[30] From all of the foregoing it appears that aging is an extremely complicated phenomenon. It would seem evident, therefore, that artificial or accelerated aging tests should not be relied upon until after very careful investigation and extended experience with their use.

Accelerated Test Limitations

The artificial aging tests commonly employed have been developed to expedite the rate of aging and to provide means whereby the future behavior of rubber products with respect to age can be rapidly estimated. Under ordinary conditions of normal aging the deterioration of most rubber compounds proceeds at such a slow rate that a period of months or even years would be required to ascertain whether or not a particular article possessed suitable resistance to deterioration for satisfactory service. In practical technical work and manufacturing such delay cannot be tolerated if any possible means is available for avoiding it. Consequently laboratory tests in which aging is accelerated by accentuating one or more of the harmful influences have found favor and have proved extremely valuable. For the tests to be reliable, however, the acceleration must be accomplished in such a way that the deterioration closely simulates that of natural aging. Because of the difficulty of reproducing in the tests the course of the reactions during normal aging and of selecting the proper test conditions to serve as an index for specific services, no single aging test having universal application has as yet been found. The various tests described are therefore applicable mainly when conditions of normal life are most closely related to the factors emphasized and when the results are made comparative by employing parallel specimens, including one rubber

[24] Kelly, Taylor, and Jones, *Ibid.*, 20, 296 (1928).
[25] van Rossem and Dekker, *Kautschuk*, 5, 13 (1929) *Rubber Chem. Tech.*, 2, 341 (1929).
[26] Gorter, *Mededeel. over Rubber*, 2, 29 (1912); *Caoutchouc & guttapercha*, 12, 8724 (1915).
[27] Whitby, *India Rubber J.*, 63, 742 (1922).
[28] Kemp, Bishop, and Lasselle, *Ind. Eng. Chem.*, 23, 1444 (1931).
[29] Cummings, *Bur. Stand. J. Res.*, 9, 163 (1932).
[30] Eaton and Day, *J. Soc. Chem. Ind.*, 38, 339T (1919).

stock of which the normal aging characteristics are known. Final judgment in all cases ultimately depends on aging under normal service conditions. These tests necessarily involve both procedures for producing the aging and methods for measuring its extent. For the latter it is customary to select a characteristic property of the material and to determine its value both before and after aging exposure. Main consideration will here be given to the methods generally employed for producing the deterioration.

Aging Test Methods

The accelerated aging procedures most commonly used are those known as the Geer[31] oven test and the Bierer-Davis[32] oxygen bomb test. In the Geer method the unstressed test samples at atmospheric pressure are freely exposed in a thermostatically controlled oven to the action of a slow stream of air at 70° plus or minus 1° C. This differs from natural aging principally in the exclusion of light and in the application of heat, the acceleration being produced by the latter. The oxygen bomb test is carried out at this same temperature, but instead of air an atmosphere of oxygen at 300 plus or minus 10 pounds per square inch is used. The details of the apparatus and the procedures for both of these methods are given in standard form in the A.S.T.M. Tentative Methods of Test for Accelerated Aging of Vulcanized Rubber (D428-35T).[33] Although both methods involve oxidation of the rubber at the same temperature, it is obvious that the aging in high-pressure oxygen would be more rapid than in air at normal pressure because of the enormously greater concentration of oxygen. The Bierer-Davis bomb tests are accordingly more severe and more highly accelerated than those in the Geer oven. The aging periods in both cases must be carefully chosen since it is undesirable for the deterioration to be so extensive as to interfere with measurement of physical properties after the treatment. It is usually advisable with a given stock to use several intervals of exposure because an idea of the rate of deterioration is thus obtained, and, also, with rubber of unknown aging characteristics there is more certainty of being able to make at least some physical tests after aging. Exposure periods frequently used range from two to 14 days in the oven and from 24 to 96 hours in the oxygen bomb.

Quite recently another procedure known as the air bomb test has received considerable acceptance. This test described by Booth[34] employs the same deteriorating factors of heat and oxidation as the air oven and the oxygen bomb tests. In this case, however, compressed air is the oxidizing agent, and considerably higher temperature is used. In practice the air pressure is maintained at 80 or 100 pounds per square inch as desired, and temperatures of 121.1° C. (250° F.) or 126.7° C. (260° F.) are generally chosen. In this test, also, the additional deteriorating influence of mechanical strain is frequently introduced by holding the samples at an elongation of 50% during the aging period. Under these conditions the deterioration of the rubber is very rapid, and the test is even more severe than the oxygen bomb. Air bomb exposures should seldom be longer in duration than 24 hours even for the most resistant compounds; while with many stocks periods from three to eight hours are considered to be quite sufficient.

(*To be continued*)

[31] Geer, India Rubber World, 55, 127 (1916); Geer and Evans, *Ibid.*, 64, 887 (1921).
[32] Bierer and Davis, *Ind. Eng. Chem.*, 16, 711 (1924); 17, 860 (1925).
[33] A. S. T. M. Proc. 35, I, 1167 (1935).
[34] Booth, *Ind. Eng. Chem.*, 24, 555 (1932).

Dispersing Effect

(*Continued from page* 40)

There are occasions when not even 10% of mineral rubber is considered sufficient for friction compounds, as is shown by the following from *India Rubber Journal*:[4]

Friction Stock	
Brown Crepe	60
Air Hose Reclaim	20
Mineral Rubber	9
Stearic Acid	1
Zinc Oxide	4
Vaseline	1
Palm Oil	1
Captax	1.5
Sulphur	2.5
Total	100.

Here we have 15% of mineral rubber on the rubber, or 11.25% on the rubber and reclaim together.

Even more mineral rubber is used in the cheap mixes for rubber heels, thus:

Heel Stocks			
Rubber	..	5	15
Reclaim	55	50	30
Mineral Rubber	10	10	10
Whiting	30	30	40
Zinc Oxide	4	4	4
Sulphur	1	1	1
Tuads	0.25	0.25	0.25
Total	100.25	100.25	100.25

In America very thick rubber heels are made from such mixes, which owing to their thickness remain springy and therefore wear down surprisingly slowly, even under heavy people. Even when mineral rubber is used merely as a low cost, low gravity filler for rubber goods, its effect is excellent. When properly used, good mineral rubber enables considerable quantities of rubber to be saved over a period of time and also allows the use of important amounts of reclaimed rubber.

[4] Feb. 18, 1928, p. 7.

Tire Vulcanizing Method

A new method of vulcanizing tires[1] is said to insure uniform curing, improvement of the cord plies flexing qualities and the tread's wear resistance, also to increase considerably the production of tires per mold by shortening the period of their use for curing. The method is as follows. An uncured tire is placed within an annular metallic mold with passageways in its walls. An annular rubber bag within the mold is then inflated by hot water, causing the tire to expand into contact with the mold wall. Steam is also conducted through the mold passageways, and the temperature of the steam and hot water is so controlled that the heat penetrating the tire from the inside meets the heat penetrating it from the outside at the center of the tire. The heating is continued long enough to solidify the rubber and cotton so that the tire may be removed from the mold without distortion. This "set cure," a partial vulcanization, proceeds to a point somewhat beyond that at which the tire would "blow" upon removal from the mold.

The "blow" point is that point in vulcanization at which, due to occluded gases formed within the tire during vulcanizing, the tire will, upon removal from the mold, still tend to be somewhat puffed, at least in places.

Following the "set cure," the partially vulcanized tires, removed from the molds, are hung on saddles movably mounted on a rail extending through a cylindrical curing chamber. The tires within the chamber are then exposed to steam, at 258° F., to complete vulcanization.

[1] U. S. patent No. 2,032,508, Mar. 3, 1936.

Lactron Thread and Lastex Yarn[1]

R. G. James, Ph.D., B.Sc., A.I.C., A.I.R.I. (Sc.)

FOR many decades rubber thread produced by cutting vulcanized rubber sheets into thin strips has been available commercially and has formed the basis of such familiar commodities as garment elastic, suspender webbing, and elastic belts and braces.

The production of a rubber thread which will satisfactorily withstand the stresses and strains imposed upon elastic garments during wear and in addition will resist deterioration due to washing, ironing, dry cleaning, bleaching dyeing, sunlight exposure, and perspiration, is a problem which has taxed the ingenuity and resource of the rubber technologist. Modern good-quality elastic thread is a high-grade rubber product subjected to very close process control and quality testing during manufacture so that it can meet the rather exacting demands of those who incorporate it into the various elastic fabrics obtainable on the market. Nevertheless the perfect rubber thread is still being sought, and in the various attempts to obtain an improved product other methods of manufacture such as the extrusion through orifices of masticated rubber, rubber naphtha doughs, and rubber latex[2] were tried. Of these later processes those involving the direct extrusion of compounded rubber latex have been most successful, and in this category comes Lactron thread. Thus Lactron thread is the registered trade mark for an elastic thread prepared directly from compounded rubber latex by an extrusion process which involves the forcing of latex mixing through orifices into a coagulant and subsequently drying and vulcanizing the coagulated filaments so formed.[3]

LATEX THREAD. The production of rubber thread directly from latex offers certain advantages over the older process of cutting rubber sheet. In the first place it is possible to arrange for the latex process to be continuous, that is, a latex mixing can be fed to one end of the machine, and vulcanized finished thread can be drawn off from the other end in continuous lengths which need be limited only by the storage system capacity or by a desire to secure samples for testing purposes. The cut sheet process is discontinuous partly on account of the different nature of the machines used for the various operations such as calendering, wrapping, curing, lapping, and cutting, and also on account of the difficulty of subjecting rubber sheets of greater lengths than 75 to 150 yards to the above processes. In the second place, latex thread can be extruded with ease in a wide range of gages, and the production of thread of extremely small diameter does not present much difficulty. On the other hand, the manufacture of regular gage cut thread of ultra-small cross-section is not easy, and such thread has only recently appeared on the market.

The fact that latex thread can be extruded with a circular cross-section is also advantageous as this section presents the minimum surface for any given cross-sectional area of rubber to external deteriorating influences.

In addition, the surface of extruded latex thread has a smooth and continuous structure; whereas cut thread has two somewhat irregular sheet faces, (due to liner cloth marking) and two smooth cut faces, which appear to be more resistant to deteriorating influences than the sheet faces[4] and doubtless react differently to chafing.

Certain of the physico-chemical properties of latex rubber can be of advantage in rubber thread. Latex rubber possesses remarkable strength even in the unvulcanized state, and tensile strengths of over 1.0 kg. per sq. mm. can be obtained for the uncured rubber, a value practically equal to that of certain fully cured brown cut rubber threads. Uncured latex thread, however, in spite of its strength would be useless on account of its very high permanent set, extremely wide stress-strain hysteresis loop, and susceptibility to the effect of solvents, oil, and temperature. By proper vulcanization the strength of latex thread can be very greatly increased, and the writer has obtained tensile strengths as high as 6.0 kg. per sq. mm. in the case of certain fine gage Lactron threads. In addition to very high strength, latex thread can exhibit good stress-strain characteristics as well as very low permanent set and very good resistance to solvents, oils, and temperature changes. High quality in these characteristics, however, must be obtained by a proper choice of compound and by careful mixing, extrusion, and vulcanizing procedure and must not be assumed for a thread merely because it is known to have been made from latex. This latter observation also applies to aging resistance, for rubber thread, particularly in ultra-fine gages, is very susceptible to rapid aging, which may account for the absence from the market of ultra-fine rubber thread until recent years.

While the direct use of latex is in itself of assistance in producing a resistant thread, the incorporation of certain antioxidants can greatly enhance the aging resistance and enable an ultra-fine diameter latex thread to be produced which is a sound commercial proposition.

At this stage it may be advantageous to explain the system of denoting the gage of rubber thread in general use in the trade. Rubber threads covering a wide range of cross-sectional areas are marketed, and it is usual to indicate the gage of a thread by stating its count. The count of a rubber thread is the number of such threads which can be laid side by side on an inch scale, i.e., a square section thread of 40's count is 1/40 in. or 0.025 in. in width. Thus in the case of a square-section thread the count is given by the reciprocal of the measurement in inches of one side of its cross-section. A rectangular section thread has, of course, two counts, but such a thread can be expressed in a single count by taking the reciprocal of the square root of the cross-sectional area.

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[1] Reprinted from *Trans. Inst. Rubber Ind.*, 1936, 2, 104-18.
[2] *Ibid.*, 1932, 8, 328.
[3] E.P. 214, 615, 1923; E.P. 311,844, 1928; E.P. 381,075, 1931.
[4] Filaments, 1935, 9, 144.

In the case of circular section thread the count is the reciprocal of the measurement in inches of its diameter. Lactron thread, which has a circular section, is usually designated with two counts, thus 38/42's, the former representing the normal count of the round thread, and the latter the normal count of the square section thread of equal cross-sectional area. Thus a round thread of 38's count has approximately the same cross-sectional area as a square section thread of 42's count.

The exact figure for the equivalent square count of any circular section thread can be obtained by multiplying the normal count of the round thread by 1.1284.

This double count system serves as a guide to users of square thread who wish to adopt Lactron thread. It may be added that counts are usually expressed commercially as whole numbers, and also generally as the nearest even number, though decimal places may be used for technical purposes.

LACTRON THREAD. As previously mentioned, Lactron thread is a continuous filament of circular cross-section, manufactured from compounded latex by a process involving extrusion into a coagulant bath, followed by washing, drying, and vulcanizing operations, all of which are carried out as a continuous process on a specially constructed machine. The manufacturing operations will now be considered in detail.

LATEX. As a considerable amount of Lactron thread is produced in ultra-fine sizes (counts as fine as 200's have been successfully extruded), it is important that the latex used should be free from dirt, sludge, and extraneous matter of comparatively large particle size. Dunlop 60% latex concentrate, produced from ordinary ammonia preserved latex by a centrifugal process, is particularly free from such extraneous matter and is used exclusively for the manufacture of Lactron thread in England.[5] In addition to the advantages of high rubber content and cleanliness, such latex also has a comparatively low proportion of serum solids to rubber content. Certain of these serum substances either on their own or in combination with certain of the compounding ingredients, particularly zinc oxide, have a pronounced effect on the extrusion properties of the latex mixing. It is therefore preferable that the amount of such serum substances should be low and that the extrusion properties of the mix should chiefly depend upon the addition of controlled amounts of substances of known effect.

COMPOUNDING PROCEDURE. As is usual in latex compounding procedure, the various ingredients are added to the latex in the form of solutions or aqueous dispersions. In the case of the latter it is particularly important that these should be of fine particle size and have no substantial tendency toward sedimentation in the latex. In the extrusion of ultra-fine thread a little mixing goes a very long way, and any stirring during processing has to be done with care to avoid aeration, which would be fatal if present to even the slightest degree. Aqueous dispersions of solid particles, therefore, are all carefully ground to a very fine particle size (at least equal to that of the average latex particle) in flint-lined pebble mills before use. For aqueous dispersions of liquids colloid mills of the Premier type are used, which consist essentially of a truncated cone revolving at several thousand revolutions per minute against a stationary seating with a clearance gap of a few thousandths of an inch. The liquid dispersions become homogenized on passing through the clearance gap due to the disperse phase being subjected to an intense shearing action. During the incorporation of dispersions the latex is thoroughly agitated by means of a high-speed propeller type of stirrer to insure perfect distribution.

TREATMENT OF MIXINGS BEFORE EXTRUSION. After the compounding operations, all latex mixings are adjusted to a standard alkalinity, viscosity, and solid content, and are carefully sieved through layers of fine mesh silk gauze before being sucked into the extrusion machine storage tanks. Vacuum is then applied to the tanks in order to effect complete deaeration of the mixing.

MIXING FLOW DURING EXTRUSION. After the deaeration operation air pressure is applied to the tanks, and the latex mixing is forced through further filters to an open reservoir which in turn feeds manifold pipes to which the extrusion nozzles are connected. For any given setting of the reservoir height the level of mixing therein is maintained constant with respect to that of the nozzle orifices by an electrical system which actuates a motor-controlled valve situated in the feed pipe leading to the reservoir. By varying the height of the reservoir, any desired pressure of mixing can be applied to the nozzles, and owing to the constant head device, this pressure will remain constant for any particular reservoir height selected.[6]

EXTRUSION NOZZLES. The extrusion nozzles consist of accurately dimensioned Pyrex glass capillary tubes fused into wider glass delivery tubes. Several sets of nozzles, of different capillary dimensions are employed in order to cover the whole range of thread counts required, but quite a wide range of thread sizes can be obtained from any one set.

COAGULANT BATH. The necessary size of coagulant bath depends upon the gage of thread to be manufactured. Comparatively small baths are used in ultra-fine count-thread manufacture as the thread need only pass through a few inches of coagulant before it is sufficiently rigid to be passed over rollers and conveyers without suffering distortion. On the other hand the coagulum formed during extrusion of thread of 20's to 40's count takes perhaps a minute to attain the necessary degree of rigidity, and therefore baths of sufficient length to give this immersion time at the desired thread withdrawal speeds must be used. Owing to the adhesive nature of the freshly coagulated filaments, it is necessary to keep the threads apart by means of separator channels placed in the coagulant bath.[7]

As regards the type of coagulant used, acetic acid of medium strength is perfectly suitable for fine gage thread production, but for very large sizes a fairly concentrated saline solution of comparatively low acidity is preferable.[8]

CONTROL OF THREAD SIZE. The exact size of thread which will be obtained during extrusion depends upon a number of factors. From Poiseuille's law for the flow of liquids through capillary tubes it follows that the volume per second of mixing issuing from any nozzle is proportional to: (1) the head of latex feeding the nozzle, (2) the dimensions of the nozzle capillary, (3) the fluidity of the latex mixing, or inversely to the viscosity of the mixing.

As, however, the latex mixing is being extruded into a coagulant, there is a retarding action due to the coagulation of the latex stream, and this retardation varies with (4) the strength and temperature of the coagulant, and (5) the stability, e.g., the alkalinity and general sensitivity to coagulating ions, of the mixing.

In addition, particularly for low latex mixing pressure heads, if the difference in density between the mixing and the coagulant solution is considerable, there is an additional factor: (6) the depth of immersion of the nozzle in the coagulant solution.

[5] E.P. 219,635, 1923; E.P. 319,410, 1928.
[6] E.P. 388,216, 1931.
[7] E.P. 370,008, 1931.
[8] E.P. 311,844, 1928; E.P. 393,057, 1932.

With a constant set of conditions involving factors (1) to (6) above, a certain quantity of latex mixing will flow from the nozzle orifice into the coagulant bath, and the gage of thread obtained by drawing off the resulting coagulum will then depend upon (7) the speed of withdrawal of the coagulum, and (8) the solid content of the liquid latex mixing used.

A final factor influencing the size of thread obtained remains, and this is: (9) the amount of stretch given to the coagulated thread after it leaves the setting bath, and before it becomes sufficiently vulcanized to be capable of recovery.

In the manufacture of Lactron thread, factors (3), (5), and (8) are controlled during the preparation of the mixing, factor (2) in the manufacture of the nozzles, and factors (4) and (6) are taken care of by the use of constant liquid level and constant temperature devices and a continuous coagulant reconditioning system in connection with the coagulant bath.

The necessity of the coagulant reconditioning system arises from the fact that apart from the normal acid-base neutralization effect and evaporation losses, the initial effect of the coagulant on the issuing mixing is to form a skin or membrane round the latex stream, and the resulting osmotic action, aided subsequently by syneresis due to the contraction of the coagulum, causes considerable dehydration of the coagulated mixing. This results in the passage of an appreciable quantity of water together with serum substances into the coagulant, which more than makes up for the volume of coagulant removed on the thread surface in large-gage thread production.

The surface speeds of the rollers drawing the threads from the coagulant bath, and of the rollers and drying belts in the subsequent operations are fixed for various thread gages and so determine factors (7) and (9).

There now remains the first factor: namely, the head of latex feeding the nozzle, and this is the means employed for setting exactly the gage of thread during production. This is effected, as mentioned above, by raising or lowering the reservoir of mixing feeding the nozzle manifolds.

Washing and Stretching Operation. After leaving the coagulant the threads, which are now sufficiently firm to pass round rollers and on to belts without suffering distortion, proceed through a bath in which hot water is circulated. The rollers which feed the threads into the hot water revolve at a slower surface speed than those which draw the threads out and pass them to the drying and vulcanizing chambers. In this manner the threads are subjected to a stretching process while immersed in the hot water. The amount of stretch given is carefully controlled for each size of thread produced[9]. By this means the range of sizes obtainable from any given set of nozzles is considerably increased, and compensation can easily be made for the loss of output weight which would otherwise occur when manufacturing the finer gages of thread.

Drying and Vulcanizing System. From the washing bath the threads pass on to a conveyer belt which carries them into a chamber in which hot air is circulated. The operations of drying and vulcanizing are effected during the passage of the thread through this chamber, and to enable reasonable production speeds to be obtained while at the same time keeping the dimensions of the plant within reasonable limits the time for vulcanization must be rather limited, and consequently fairly high temperatures must be used.[10] If the threads are not thoroughly dried before reaching the vulcanizing section of the chamber, blow-holes or blisters will form and the material will be useless. Although a single conveyer belt suffices for very fine gage thread, the larger sizes require a much longer drying time and are therefore passed backward and forward on a series of conveyer belts through the drying chamber. The temperature of the circulating air gradually increases as the threads pass through the system and finally, when perfectly dry, they pass through the hottest section, where vulcanization takes place. The initial temperature used in the drying process is of the order of 200° F. This increases as the threads become drier, and final temperatures of 300° F. to 400° F. are used during vulcanization.

Collecting the Threads. After leaving the vulcanizing section the threads pass through a bank of French chalk, then over an illuminated inspection table, and are finally wound up on to spools, or on to large drums according to whether the threads are to be converted into Lastex yarn or to be made into warp form for other purposes.

Examination. During production the threads are continually examined for imperfections and individually checked for size by means of calibrated projection microscopes and for state of vulcanization by means of special tests involving an examination of the stress-strain cycle characteristics.

Uses of Lactron Thread. Lactron thread has been successfully employed in the manufacture of all the usual elastic fabrics such as webs for braces, belts, and suspenders, braids for garment elastic, and a variety of elastic cords ranging from the large section multicolored type used for shock-absorbers[11] to the narrow-gage single-cored type used particularly in corsetry.

It is not intended, however, to elaborate these uses, but rather to single out that special function of Lactron thread which concerns the title of this paper: namely, its use in manufacturing Lastex yarn. *(To be continued.)*

[9] E.P. 397,419, 1932.
[10] E.P. 381,075, 1931; E.P. 404,704, 1931.
[11] *Trans. Inst. Rubber Ind.*, 1926, 2, 55.

Latex Impregnation of Yarn[1]

A recently invented process of impregnating yarn, etc., and removing excess of rubber dispersion or solution is carried out in a closed vessel connected with storage and circulating vessels provided with a pump for circulating the liquid and includes the step of forcing the rubber-containing liquid continuously through the material at a pressure above atmosphere. The impregnation process may be carried out by circulating the rubber dispersion alternately first in one direction, then in the opposite, and the direction of flow may be reversed as desired.

After impregnation of the textile material with the rubber dispersion has been carried out, the excess dispersion is drained from the open packet of yarn, and a sudden and powerful blast of air is passed through the packet to remove any excess dispersion adhering in films to and between the thread surfaces.

The impregnating liquid may contain vulcanizing agent as sulphur in a soluble or colloidal form, e.g., ammonium polysulphide and subsidiary reagents as accelerators, activators, or antioxidants, all in soluble or colloidal form and all mixed with the rubber dispersion under conditions which prevent coagulation of the rubber. When such impregnating liquids are employed, the rubber may be vulcanized during drying, succeeding the impregnation.

Impregnation is normally carried out at ordinary atmospheric temperature, but the temperature may, if desired, be raised somewhat provided coagulation of the rubber is prevented. On the other hand in operating this process in tropical countries the rubber dispersion may be cooled.

[1] U. S. patent No. 2,031,094, Feb. 18, 1936.

Rubber Business Survey

THE accompanying data comprise a detailed survey of various significant phases of the activities of the rubber industry in the United States and extend over differing periods of time, determined by the availability of reliable statistics. The facts presented here are taken from the "1936 Supplement-Survey of Current Business," compiled by the United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C., recently issued for the first time since 1932.

Perusal of these interesting data regarding crude, reclaimed, and scrap rubber, as well as those of the most important classses of manufactured products, impresses one with the remarkable over-all growth of the rubber industry in this country within the past 15 years.

FABRICS AND RUBBER AND CANVAS FOOTWEAR

Year and Month	Single and double texture proofed fabrics, production	Rubber and canvas footwear											
		Production			Shipments			Domestic shipments			Stocks, end of month		
		Total	Tennis	Waterproof	Total	Tennis	Waterproof	Total	Tennis	Waterproof	Total	Tennis	Waterproof
	Thous. of yards	Thousands of pairs											
1929 monthly average	3,323	8,397	3,663	4,734	8,062	3,320	4,742	7,024	2,639	4,386	31,911	10,057	21,855
1930 monthly average	2,669	6,758	3,042	3,716	6,830	3,152	3,677	6,187	2,734	3,453	38,343	12,425	25,917
1931 monthly average	2,479	4,767	2,340	2,427	5,609	2,696	2,914	5,426	2,553	2,873	30,039	10,123	19,916
1932													
January	1,846	4,394	3,061	1,333	4,941	2,911	2,030	4,907	2,885	2,022	25,165	10,436	14,730
February	2,215	4,649	3,956	693	5,494	4,184	1,310	5,447	4,143	1,304	24,311	10,134	14,178
March	2,151	5,888	5,134	753	6,151	5,229	923	6,083	5,170	913	24,057	10,044	14,013
April	1,891	5,052	4,226	825	6,242	5,364	877	6,164	5,313	851	22,872	8,911	13,962
May	1,551	5,571	4,274	1,297	6,204	5,645	560	6,103	5,555	548	22,274	7,557	14,717
June	1,935	5,476	3,553	1,923	5,343	4,707	636	5,269	4,642	626	22,407	6,403	16,004
July	1,789	2,879	1,468	1,412	3,696	2,181	1,515	3,643	2,152	1,491	21,613	5,690	15,923
August	2,684	4,450	1,686	2,764	4,162	1,482	2,680	4,075	1,441	2,633	21,666	5,659	16,007
September	4,210	4,696	1,459	3,237	5,793	1,531	4,262	5,727	1,504	4,224	20,569	5,586	14,983
October	4,514	5,167	1,293	3,874	6,557	736	5,820	6,501	700	5,801	19,179	6,143	13,036
November	3,558	6,248	1,698	4,550	6,738	556	6,182	6,682	517	6,165	18,712	7,302	11,409
December	1,538	5,959	1,966	3,993	6,029	676	5,354	5,980	636	5,343	18,652	8,604	10,049
Monthly average	**2,490**	**5,036**	**2,814**	**2,221**	**5,612**	**2,933**	**2,679**	**5,548**	**2,888**	**2,660**	**21,790**	**7,706**	**14,084**
1933													
January	1,831	4,733	2,362	2,370	3,995	2,240	1,756	3,970	2,224	1,746	19,567	5,653	10,914
February	1,903	4,123	2,697	1,426	4,461	2,785	1,676	4,429	2,772	1,657	19,228	8,565	10,663
March	2,169	4,099	3,253	846	4,226	3,509	717	4,162	3,457	705	19,083	8,309	10,773
April	2,747	3,956	3,255	701	4,567	3,989	578	4,522	3,953	569	18,468	7,575	10,893
May	4,424	4,845	3,450	1,395	5,252	4,341	910	5,173	4,285	887	18,061	6,684	11,378
June	5,536	4,724	2,658	2,066	4,908	3,809	1,099	4,824	3,734	1,090	17,884	5,538	12,346
July	5,408	4,892	1,848	3,045	5,504	2,779	2,724	5,404	2,693	2,710	17,402	4,731	12,671
August	4,670	6,819	2,343	4,476	6,586	2,024	4,561	6,482	1,945	4,538	17,684	5,104	12,580
September	3,573	6,214	1,703	4,511	7,837	1,557	6,280	7,751	1,500	6,251	16,057	5,250	10,807
October	3,423	6,739	1,746	4,993	6,707	761	5,945	6,812	887	5,925	15,809	6,776	9,034
November	2,140	6,890	2,113	4,777	6,318	854	5,563	6,503	961	5,541	16,601	8,298	8,303
December	1,376	6,193	2,486	3,707	4,617	911	3,707	4,788	1,095	3,693	18,463	10,205	8,258
Monthly average	**3,367**	**5,352**	**2,493**	**2,959**	**5,423**	**2,463**	**2,960**	**5,402**	**2,459**	**2,943**	**17,859**	**7,141**	**10,718**
1934													
January	2,231	6,247	3,584	2,663	7,231	4,133	3,098	7,207	4,129	3,078	15,583	7,742	7,841
February	2,893	5,430	3,580	1,850	4,585	3,241	1,345	4,555	3,220	1,335	16,394	8,165	8,229
March	3,141	6,467	4,186	2,281	6,845	5,419	1,426	6,796	5,378	1,418	16,016	6,932	9,084
April	3,302	4,843	2,451	2,392	2,749	1,868	881	2,673	1,798	875	17,774	7,378	10,396
May	3,314	4,919	1,819	3,100	2,927	2,084	843	2,874	2,036	838	20,080	7,259	12,821
June	2,678	4,478	1,566	2,912	3,613	1,980	1,633	3,561	1,933	1,629	20,945	6,846	14,099
July	2,806	3,587	843	2,744	4,611	1,174	3,436	4,594	1,170	3,425	19,935	6,515	13,419
August	3,722	5,161	1,011	4,150	6,529	1,543	4,986	6,448	1,467	4,982	18,567	5,983	12,584
September	4,174	3,918	877	3,041	6,475	920	5,555	6,412	866	5,547	15,858	5,841	10,017
October	4,475	5,078	1,201	3,877	5,525	790	4,735	5,486	758	4,727	15,248	6,085	9,163
November	3,014	4,992	1,165	3,827	4,727	575	4,152	4,653	528	4,125	15,513	6,675	8,838
December	2,590	4,870	1,570	3,300	5,317	1,258	4,060	5,273	1,240	4,033	15,177	6,999	8,178
Monthly average	**3,196**	**4,999**	**1,988**	**3,012**	**5,095**	**2,032**	**3,013**	**5,045**	**2,043**	**3,001**	**17,257**	**6,868**	**10,389**
1935													
January	3,489	5,668	2,668	2,999	6,379	2,778	3,601	6,250	2,661	3,589	14,466	6,890	7,576
February	3,374	5,383	3,083	2,300	4,752	3,284	1,468	4,619	3,165	1,454	15,087	6,690	8,397
March	3,815	5,863	3,673	2,190	5,087	4,023	1,064	5,041	3,997	1,044	15,854	6,331	9,523
April	3,763	5,415	3,188	2,226	4,210	3,276	934	4,170	3,243	927	17,056	6,241	10,815
May	3,738	4,857	2,376	2,481	3,688	2,579	1,109	3,623	2,521	1,102	18,202	6,026	12,176
June	3,565	4,151	1,391	2,760	3,002	1,774	1,227	2,964	1,742	1,222	19,358	5,642	13,716
July	3,922	3,147	702	2,445	3,737	1,507	2,230	3,667	1,490	2,177	18,767	4,836	13,931
August	4,782	4,699	1,056	3,643	6,132	1,340	4,792	6,106	1,322	4,784	15,653	4,156	11,497
September	5,164	4,427	873	3,554	5,510	889	4,622	5,489	881	4,608	14,559	4,137	10,422
October	5,122	5,874	1,297	4,577	5,733	673	5,059	5,705	654	5,051	14,700	4,761	9,939
November	2,874	5,172	1,301	3,871	5,657	491	5,165	5,626	467	5,159	14,200	5,571	8,630
December	2,447	5,993	1,661	4,332	6,276	830	5,446	6,252	815	5,437	14,967	6,743	8,224
Monthly average	**3,838**	**5,054**	**1,939**	**3,115**	**5,014**	**1,954**	**3,060**	**4,959**	**1,913**	**3,046**	**16,072**	**5,669**	**10,404**

The trend of crude rubber volume consumption has been upward continuously throughout the 14-year period shown; and this regardless of the fact that the period includes depression years in which the rubber industry, like most others, has been operating on a sub-normal basis. Judging from crude rubber consumption facts alone, one would be convinced that the rubber industry had not been adversely affected by the past few years of distressing business conditions. That such is not the case, however, is too well known.

A study of the statistics covering the relation of world and United States crude rubber stocks with respect to consumption and price fluctuation brings to mind a whole panorama of significant episodes, important among which have been the Stevenson plan, with its disastrous consequences, and the beginning of the present restriction scheme which has proved its stabilizing possibilities, but which is now undergoing the crucial test of administrative competency and honesty of purpose.

While it is not the purpose of these comments to re-

RUBBER HEELS AND SOLES

Year and Month	RUBBER HEELS						RUBBER SOLES					
	Production	Shipments				Stocks, end of month	Production	Shipments				Stocks, end of month
		Total	Export	Repair trade	Shoe manufacturers			Total	Export	Repair trade	Shoe manufacturers	
	Thousands of pairs											
1923 monthly average	15,243	14,061	----------	4,172	9,889	33,962	----------	----------	----------	----------	----------	----------
1924 monthly average	15,523	15,163	----------	4,750	10,412	33,110	----------	----------	----------	----------	----------	----------
1925 monthly average	17,247	16,971	719	5,727	10,764	40,569	1,801	1,756	15	278	1,464	2,426
1926 monthly average	15,276	15,282	770	5,614	8,899	48,590	1,021	979	35	146	799	3,129
1927 monthly average	16,692	16,384	912	6,958	8,514	43,823	2,263	2,297	85	662	1,551	3,599
1928 monthly average	19,598	18,547	950	7,844	9,752	48,727	3,137	2,994	204	916	1,873	4,529
1929 monthly average	19,344	20,106	1,032	7,064	12,009	45,257	2,875	2,926	64	589	2,273	3,713
1930 monthly average	14,838	15,427	935	5,702	8,790	34,975	2,460	2,483	60	362	2,061	2,922
1931 monthly average	14,700	14,849	587	4,842	9,419	26,796	2,835	2,889	48	288	2,553	2,537
1932												
January	12,316	12,425	290	3,431	8,704	24,515	3,411	3,226	8	264	2,954	2,085
February	14,787	13,583	259	4,575	8,748	25,807	3,461	3,213	3	285	2,925	2,428
March	16,368	13,514	305	5,785	9,424	27,933	3,953	3,573	2	252	3,320	2,691
April	11,737	9,874	280	2,656	6,938	28,340	2,292	2,340	1	252	2,087	2,759
May	10,259	10,270	275	3,651	6,345	28,782	2,488	2,703	4	151	2,549	2,434
June	11,299	12,304	266	3,708	8,330	27,736	2,461	2,500	5	133	2,362	2,374
July	9,868	10,141	261	2,449	7,432	27,397	2,419	2,407	14	113	2,280	2,308
August	11,073	14,395	187	4,260	9,948	24,449	2,599	2,660	12	140	2,508	2,373
September	14,205	18,000	297	5,520	12,183	20,534	4,054	4,353	7	215	4,131	2,024
October	16,736	16,222	233	5,012	10,977	21,029	5,081	4,793	4	269	4,519	2,168
November	14,162	13,188	184	3,966	9,038	21,749	4,780	4,420	5	316	4,099	2,559
December	12,433	13,641	258	2,423	10,960	20,337	4,647	5,265	6	209	5,050	2,369
Monthly average	**12,937**	**13,130**	**258**	**3,786**	**9,086**	**24,884**	**3,471**	**3,454**	**6**	**217**	**3,232**	**2,381**
1933												
January	13,142	11,336	209	2,433	8,694	21,808	4,247	3,777	1	275	3,502	2,766
February	13,030	10,888	221	2,909	7,758	25,267	4,008	3,728	3	362	3,362	3,121
March	11,222	10,761	170	2,677	7,914	25,549	3,959	3,690	0	271	3,419	3,302
April	10,353	12,383	281	4,441	7,661	23,740	3,108	3,256	1	266	2,988	3,215
May	19,427	20,484	182	6,883	13,419	22,688	5,209	5,482	0	335	5,146	3,006
June	23,479	27,717	284	7,155	20,278	18,402	6,094	6,786	5	395	6,386	2,228
July	21,496	20,116	293	6,184	13,638	19,861	5,154	5,024	4	436	4,584	2,333
August	22,632	18,410	282	7,352	10,775	24,123	5,177	4,392	8	579	3,806	3,011
September	19,621	14,809	306	4,635	9,868	28,637	4,351	3,803	3	281	3,518	3,645
October	19,103	14,157	340	3,765	10,052	33,750	4,244	3,678	9	333	3,336	4,286
November	15,955	11,287	337	4,552	6,398	38,436	4,054	2,763	2	409	2,351	5,559
December	13,625	12,738	322	3,215	9,201	37,528	4,496	4,527	3	281	4,244	4,281
Monthly average	**16,924**	**15,424**	**269**	**4,683**	**10,471**	**26,649**	**4,508**	**4,242**	**3**	**352**	**3,887**	**3,396**
1934												
January	14,826	13,463	432	2,833	10,198	42,587	5,499	5,594	5	388	5,201	5,090
February	16,293	20,543	175	9,273	11,096	38,986	5,711	5,804	1	617	5,186	5,010
March	19,903	19,151	347	6,605	12,199	39,592	5,726	5,770	3	532	5,235	4,838
April	17,802	16,991	328	4,673	11,991	39,961	5,018	4,739	5	275	4,459	4,989
May	19,603	20,120	137	6,928	13,055	39,763	5,040	4,881	1	493	4,387	5,360
June	19,412	20,513	426	3,946	16,142	38,446	4,772	5,050	10	241	4,799	4,956
July	15,903	15,656	346	4,485	10,825	38,997	3,082	3,277	2	318	2,956	4,933
August	18,605	15,493	339	4,936	10,218	42,140	3,601	3,601	2	382	3,218	4,894
September	13,911	13,218	219	4,079	8,921	42,652	2,952	3,107	2	455	2,650	4,718
October	14,437	16,889	377	5,238	11,273	40,016	3,239	3,297	13	584	2,699	4,656
November	13,922	15,746	326	4,175	11,244	38,040	3,541	3,617	3	585	3,030	4,528
December	13,428	14,075	359	3,435	10,281	37,751	3,400	3,592	3	530	3,059	4,329
Monthly average	**16,504**	**16,822**	**318**	**5,051**	**11,453**	**39,911**	**4,298**	**4,361**	**4**	**450**	**3,907**	**4,859**
1935												
January	14,351	16,630	296	5,667	10,667	35,811	3,705	3,696	9	650	3,037	4,311
February	16,334	15,260	221	4,777	10,262	36,950	3,243	3,601	7	704	2,890	3,948
March	16,256	16,926	439	5,102	11,385	36,349	3,357	3,410	7	563	2,840	3,904
April	17,173	18,764	241	7,405	11,118	34,869	3,525	3,543	7	631	2,905	3,897
May	20,262	19,658	336	7,471	11,850	35,602	3,607	3,701	6	505	3,190	3,733
June	19,105	18,694	356	5,578	12,760	34,250	3,567	3,509	8	380	3,121	3,887
July	17,836	17,492	233	4,810	12,449	34,746	3,599	3,597	11	384	3,202	3,875
August	18,016	16,267	177	4,054	12,036	36,464	3,166	3,099	5	449	2,646	3,967
September	16,406	17,067	187	5,187	11,694	36,051	3,021	3,160	3	660	2,497	3,844
October	18,517	18,814	296	5,029	13,489	36,291	4,022	4,141	1	625	3,515	3,731
November	16,024	16,886	428	4,173	12,285	30,710	3,399	3,528	11	492	3,025	3,121
December	16,649	17,094	348	2,829	13,917	30,374	3,698	3,544	1	401	3,142	3,164
Monthly average	**17,244**	**17,463**	**297**	**5,174**	**11,993**	**34,872**	**3,492**	**3,544**	**6**	**537**	**3,001**	**3,782**

view all the interesting facts that can be gleaned from studying these data, there are a few significant trends that should not escape attention. Tire and tube production more than all else together has been responsible for the continuous growth of the rubber industry although the data showing unit production since 1921 would not seem to bear out this contention. It is unfortunate that the data do not include a tonnage column. The case then would be clear. Changes in the design and the prevailing sizes of tires during this period have been such that each unit now has an average weight which exceeds that of the 1921 tire by approximately 75%. The increase of rubber content has been substantially greater than that of fabric, and the accompanying data show that to have exceeded 10%. By comparing the unit production of tires with car registration, not shown here, through these years, one will be impressed with the increasing longevity of the present-day tire, and to an even greater extent of tubes which were produced and shipped in the ratio of approximately 1.2 tubes to one tire in 1921, but now each tire consumes but 0.99 tube.

The use of rubber shoes has contributed nothing to

AUTOMOBILE TIRES AND TUBES

Year and Month	Pneumatic Casings				Inner Tubes				Raw Material Consumed, Fabrics
	Production	Shipments		Stocks, end of month	Production	Shipments		Stocks, end of month	
		Total	Domestic			Total	Domestic		
	Thousands								Thousands of pounds
1921 monthly average	2,275	2,434	2,380	5,396	2,673	2,744	2,710	5,478	8,928
1922 monthly average	3,411	3,336	3,230	6,491	3,936	3,843	3,772	7,506	12,343
1923 monthly average	3,786	3,709	3,591	7,545	4,769	4,685	4,595	9,308	13,149
1924 monthly average	4,235	4,111	3,992	7,105	5,553	5,344	5,238	9,400	15,824
1925 monthly average	4,899	4,782	4,633	7,610	6,449	6,321	6,190	10,374	18,700
1926 monthly average	5,010	4,798	4,678	10,599	6,192	5,785	5,699	16,938	18,008
1927 monthly average	5,296	5,261	5,041	10,832	5,905	6,135	6,001	15,873	19,312
1928 monthly average	6,282	5,990	5,772	11,343	6,743	6,487	6,339	15,530	25,027
1929 monthly average	5,814	5,870	5,623	14,233	6,170	6,328	6,159	16,016	24,527
1930 monthly average	4,299	4,525	4,305	11,599	4,594	4,815	4,672	12,572	24,027
1931 monthly average	4,095	4,206	4,054	9,265	4,097	4,241	4,135	9,505	16,822
1932									
January	3,480	3,269	3,197	7,952	3,442	3,550	3,496	7,819	15,953
February	3,891	2,566	2,478	9,218	3,871	2,764	2,704	8,874	16,428
March	3,690	2,969	2,865	9,927	3,548	2,721	2,651	9,571	14,819
April	3,535	3,716	3,626	9,895	3,267	3,429	3,366	9,564	14,545
May	3,839	4,280	4,177	9,426	3,454	3,917	3,843	9,030	15,807
June	5,672	10,115	10,013	5,024	5,347	9,137	9,064	5,242	22,940
July	3,635	2,416	2,318	6,234	2,976	2,188	2,119	6,053	15,363
August	3,105	2,668	2,594	6,692	2,784	2,536	2,489	6,207	13,275
September	2,551	3,098	3,028	6,127	2,635	3,138	3,090	5,828	11,046
October	2,582	1,808	1,740	6,911	2,215	1,680	1,636	6,295	10,951
November	2,315	1,720	1,641	7,492	2,031	1,599	1,546	6,749	10,272
December	1,993	1,828	1,765	7,683	1,802	1,746	1,707	6,837	7,865
Monthly average	**3,357**	**3,371**	**3,287**	**7,715**	**3,114**	**3,200**	**3,143**	**7,339**	**14,106**
1933									
January	2,262	2,601	2,518	7,249	2,110	2,556	2,507	6,247	10,127
February	2,343	2,296	2,209	7,389	2,242	2,120	2,074	6,409	9,312
March	2,041	2,095	2,023	7,302	1,898	1,918	1,873	6,421	8,159
April	3,129	3,660	3,598	6,785	2,876	3,076	3,037	6,240	13,411
May	5,198	5,189	5,104	6,771	4,739	4,500	4,448	6,434	21,511
June	6,110	6,316	6,231	6,626	5,493	5,825	5,766	6,147	25,068
July	5,722	5,506	5,414	6,855	5,648	5,254	5,179	6,493	23,986
August	5,002	4,715	4,599	7,081	4,957	4,726	4,644	6,683	21,565
September	4,006	3,509	3,398	7,607	3,868	3,501	3,426	7,066	17,425
October	3,434	2,541	2,433	8,476	3,534	2,698	2,620	7,895	14,251
November	3,044	2,201	2,111	9,262	2,887	2,120	2,061	8,696	13,394
December	3,087	3,537	3,414	8,903	2,652	3,437	3,347	7,879	12,803
Monthly average	**3,781**	**3,680**	**3,588**	**7,525**	**3,575**	**3,477**	**3,415**	**6,884**	**15,918**
1934									
January	3,922	3,222	3,137	9,684	3,551	3,199	2,108	8,403	16,946
February	4,335	3,285	3,202	10,725	4,078	3,323	3,385	9,167	19,300
March	5,180	4,223	4,089	11,651	5,194	4,118	4,027	10,244	21,575
April	4,770	4,438	4,344	11,981	4,735	4,342	4,269	10,585	19,970
May	4,456	5,332	5,205	11,127	4,359	4,902	4,807	10,043	19,366
June	4,342	5,228	5,109	10,219	4,097	5,309	5,215	8,795	18,263
July	3,353	4,157	4,076	9,437	3,531	4,323	4,260	8,053	13,678
August	3,533	4,308	4,218	8,697	3,680	4,198	4,127	7,555	14,149
September	2,936	3,183	3,085	8,419	3,110	3,024	2,960	7,639	13,342
October	3,287	3,010	2,921	8,657	3,219	2,689	2,621	8,151	13,576
November	3,341	3,191	3,120	8,779	3,169	2,767	2,711	8,502	15,858
December	3,778	3,109	3,012	9,455	3,503	2,850	2,773	9,180	16,110
Monthly average	**3,936**	**3,891**	**3,793**	**9,903**	**3,852**	**3,754**	**3,605**	**8,860**	**16,844**
1935									
January	4,626	3,663	3,576	10,398	4,259	3,722	3,649	9,621	20,214
February	4,383	3,287	3,208	11,530	4,171	3,362	3,299	10,466	18,617
March	4,346	4,204	4,124	11,675	4,123	4,168	4,103	10,406	18,125
April	4,512	5,144	5,059	11,003	4,259	4,453	4,384	10,170	18,499
May	4,175	4,067	3,969	11,131	3,892	3,451	3,388	10,615	17,864
June	3,910	4,262	4,187	10,755	3,480	4,024	3,959	10,050	16,291
July	3,532	5,447	4,342	8,850	3,251	5,269	5,209	8,005	15,328
August	3,993	4,739	4,671	7,805	3,894	4,556	4,503	6,939	17,081
September	3,787	3,303	3,235	8,288	4,125	3,426	3,377	7,565	15,563
October	4,051	4,095	4,022	8,291	4,435	4,027	3,969	8,053	17,467
November	3,997	3,990	3,913	8,249	3,942	3,747	3,688	8,161	16,695
December	4,051	4,154	4,087	8,196	4,048	4,034	3,986	8,231	16,830
Monthly average	**4,030**	**4,196**	**4,033**	**9,681**	**3,990**	**4,020**	**3,959**	**9,023**	**17,381**

the increasing use of rubber. On the contrary rubber shoe volume describes a downward trend. This is true notably of the tennis variety. While the public apparently is losing interest in rubber footwear, it favors the shock absorbing feature of rubber treaded shoes as is evident by the inclining trend of the heel and sole business.

CRUDE AND SCRAP RUBBER

Year and Month	Crude rubber: Consumption: Total	Crude rubber: Consumption: For tires and tubes	Crude rubber: Total imports, including latex	Crude rubber: Wholesale price, smoked sheets (N. Y.)	Crude rubber: Shipments, world	Crude rubber: Stocks, end of month: World total	Crude rubber: Stocks, end of month: Afloat: Total	Crude rubber: Stocks, end of month: Afloat: For United States	Crude rubber: Stocks, end of month: London and Liverpool	Crude rubber: Stocks, end of month: British Malaya	Crude rubber: Stocks, end of month: United States	Reclaimed rubber: Consumption	Reclaimed rubber: Production	Reclaimed rubber: Stocks, end of month	Scrap rubber, consumption by reclaimers (quarterly)
	Long tons			Dolls. per lb.	Long tons										
1913 monthly average			4,311												
1914 monthly average			5,322												
1915 monthly average			8,240												
1916 monthly average			10,048												
1917 monthly average			15,091												
1918 monthly average			12,126		20,132										
1919 monthly average			19,938		31,822										
1920 monthly average			21,077		28,644										
1921 monthly average		10,668	15,450	0.164	24,804		31,038		76,529						11,509
1922 monthly average	23,606	16,747	25,090	.174	31,883		42,284		78,296						17,211
1923 monthly average	22,913	18,217	25,762	.296	34,280		46,973	33,589	46,973	24,287	36,409				22,001
1924 monthly average	25,148	22,512	27,338	.261	35,384	188,587	48,908	40,026	52,581	19,987	64,934	8,494			25,710
1925 monthly average	32,302	27,400	33,054	.719	42,539	136,017	58,759	43,916	11,275	16,760	47,902	11,418			39,770
1926 monthly average	30,513	25,094	34,445	.485	51,813	201,557	63,691	44,366	28,625	51,732	57,509	13,710		16,970	54,074
1927 monthly average	30,336	24,947	35,519	.376	50,556	277,493	65,293	46,609	67,126	59,985	85,090	15,792		23,708	55,547
1928 monthly average	36,417	30,185	36,388	.223	54,486	266,278	66,442	50,492	42,775	74,630	80,764	18,583		18,335	65,580
1929 monthly average	38,950	31,430	46,984	.205	71,690	306,541	90,290	64,725	44,475	74,376	97,204	18,085	17,857	21,503	68,230
1930 monthly average	31,333	24,532	40,544	.119	68,011	438,005	90,427	56,178	103,663	81,404	161,679	12,788	13,344	21,773	46,155
1931 monthly average	29,167	22,692	41,816	.061	66,019	552,254	88,225	48,282	133,308	86,142	244,580	10,250	10,807	20,626	38,660
1932															
January	29,648	21,589	33,552	.044	65,254	623,416	85,000	42,234	125,332	88,774	324,310	8,971	8,678	22,655	
February	31,821	23,126	28,398	.039	59,747	611,819	81,500	51,728	126,036	85,379	318,904	8,857	8,656	22,590	
March	29,506	21,210	45,588	.033	57,813	614,894	77,700	44,190	125,065	79,401	332,728	7,888	8,539	23,880	29,762
April	27,518	20,749	38,454	.030	55,779	615,803	75,600	40,387	123,323	75,945	341,535	5,987	5,626	23,129	
May	30,957	22,076	34,323	.031	60,657	612,474	79,300	50,453	116,106	73,672	343,396	6,534	5,088	20,287	
June	41,475	33,604	41,117	.027	55,998	595,712	76,200	43,079	109,597	68,855	341,060	7,569	5,998	18,131	19,045
July	29,976	22,501	32,524	.028	59,771	589,037	78,400	37,894	106,172	62,887	341,578	5,525	5,486	17,543	
August	23,721	19,324	33,989	.037	56,385	597,274	76,300	42,846	104,408	66,134	350,432	4,717	3,306	15,713	
September	23,847	16,157	29,280	.039	60,164	599,986	79,000	46,188	103,195	64,321	353,470	5,636	5,376	15,109	16,229
October	22,286	15,888	35,806	.034	54,535	609,368	74,600	40,176	100,001	68,836	365,931	5,914	6,689	14,946	
November	23,231	14,302	29,620	.034	57,829	614,342	76,000	40,879	96,324	71,441	370,577	5,635	6,625	15,093	
December	18,015	11,379	32,016	.033	61,930	629,898	81,200	38,360	92,674	77,024	379,000	4,271	5,698	16,334	19,512
Monthly average	**27,667**	**20,159**	**34,556**	**.034**	**58,822**	**609,502**	**78,350**	**43,201**	**110,686**	**73,556**	**346,910**	**6,459**	**6,314**	**18,784**	**21,137**
1933															
January	22,842	15,644	30,663	.036	65,037	634,797	85,700	32,539	89,153	74,590	385,354	5,011	4,983	13,940	
February	21,578	14,379	22,969	.029	55,926	626,227	77,600	32,898	90,273	71,668	386,686	4,545	4,303	14,206	
March	17,997	12,310	28,475	.030	61,573	638,428	80,200	29,531	94,658	67,583	395,987	3,597	3,617	13,282	14,132
April	25,856	20,129	21,038	.036	56,564	629,159	77,100	30,745	95,151	66,911	389,997	4,590	4,340	12,322	
May	43,951	33,312	26,736	.049	66,111	626,537	85,000	43,342	98,609	72,617	370,311	8,093	7,864	11,770	
June	50,602	38,842	23,504	.061	63,864	613,055	87,000	63,608	102,511	82,331	341,213	10,076	9,956	11,344	27,800
July	49,476	37,165	45,243	.078	73,983	618,258	95,300	57,435	99,906	88,199	334,853	10,756	11,326	12,090	
August	44,304	32,637	45,413	.073	75,114	617,449	99,800	53,084	96,661	87,866	333,122	9,838	11,005	12,891	
September	35,183	25,847	46,255	.073	74,731	623,683	99,800	57,255	95,022	87,539	341,322	8,189	9,809	13,602	37,628
October	31,455	23,056	46,034	.076	85,131	636,597	110,000	58,568	89,766	84,049	352,782	7,512	8,898	15,202	
November	28,751	20,144	41,821	.086	78,127	642,968	106,500	57,140	87,984	85,231	363,253	6,598	8,519	16,429	
December	29,005	19,835	40,751	.088	90,151	654,890	116,200	55,606	86,505	87,185	365,000	6,198	8,966	17,780	33,486
Monthly average	**33,417**	**24,442**	**34,908**	**.060**	**70,586**	**630,171**	**93,350**	**47,646**	**93,850**	**79,647**	**363,323**	**7,084**	**7,799**	**13,738**	**28,264**
1934															
January	39,284	27,595	49,088	.093	80,753	661,948	110,803	45,768	90,320	88,215	372,610	7,018	9,204	21,020	
February	40,609	29,179	35,220	.104	87,029	663,308	113,947	53,063	92,519	92,210	364,632	7,665	8,901	20,240	
March	47,097	34,810	42,253	.109	91,282	666,382	120,292	54,722	94,337	96,499	355,254	9,709	10,751	21,760	32,731
April	44,849	32,185	45,367	.126	83,330	658,796	113,757	56,251	96,134	97,146	351,759	9,411	10,148	19,100	
May	42,919	31,129	49,938	.133	113,368	689,239	141,145	57,921	96,214	96,971	354,909	9,525	10,808	19,840	
June	40,154	28,465	48,748	.134	72,689	672,804	110,478	46,698	99,733	102,045	360,548	9,485	10,780	20,500	36,875
July	32,541	22,714	42,674	.146	72,424	676,200	96,654	45,869	105,989	106,448	367,109	8,196	9,412	21,600	
August	33,200	23,205	32,700	.155	73,208	674,702	97,349	40,278	105,290	107,667	364,456	8,515	8,130	21,320	
September	30,251	20,478	32,010	.154	89,313	694,361	113,716	38,831	113,052	103,485	364,108	7,042	6,949	21,260	27,693
October	31,244	21,123	29,240	.139	69,097	680,616	98,868	38,247	121,020	101,349	359,379	8,188	8,115	21,240	
November	34,765	24,193	37,212	.130	76,805	684,408	99,837	38,625	127,888	96,556	360,127	7,795	7,241	20,800	
December	36,581	25,914	18,171	.129	99,365	705,975	124,976	47,644	134,927	91,072	355,000	8,306	7,326	20,000	25,959
Monthly average	**37,791**	**26,749**	**38,552**	**.129**	**84,055**	**677,395**	**111,819**	**48,903**	**106,452**	**98,300**	**360,824**	**8,405**	**8,980**	**20,723**	**30,815**
1935															
January	46,571	33,582	40,523	.136	74,629	698,153	113,000	42,066	148,337	98,471	338,345	11,703	10,206	15,113	
February	42,699	30,589	47,844	.129	74,154	686,195	103,000	42,969	155,727	94,695	332,773	10,118	9,823	15,266	
March	42,138	29,724	46,640	.114	66,855	678,809	92,000	44,485	162,012	91,069	333,728	10,125	10,288	13,991	32,709
April	44,209	32,809	41,456	.115	75,072	677,006	97,400	37,651	165,064	86,723	328,118	10,877	10,060	13,923	
May	41,098	29,792	30,705	.120	77,179	677,569	103,200	44,375	167,745	91,345	311,000	10,329	9,970	12,597	
June	36,209	26,764	32,182	.126	72,360	671,525	101,000	55,581	171,303	89,979	315,000	9,053	8,377	12,155	32,588
July	35,973	25,793	48,131	.121	70,087	679,061	96,000	49,018	174,141	89,098	315,000	8,725	8,213	12,070	
August	38,799	27,028	41,483	.120	70,000	680,644	101,000	47,724	177,250	80,843	321,551	9,140	9,321	12,393	
September	37,129	26,235	35,707	.116	74,000	661,509	100,000	43,413	174,894	67,361	319,254	9,108	8,817	12,376	23,498
October	41,956	29,169	36,378	.127	75,000	655,000	100,000	49,913	168,570	71,868	312,112	10,042	11,631	13,311	
November	42,295	28,170	26,073	.131	63,000	623,300	89,000	46,588	166,896	66,794	294,610	9,441	11,198	14,569	
December	42,457	28,640	39,812	.132	62,000	611,987	82,000	39,094	164,200	61,692	303,000	8,856	12,002	17,000	29,772
Monthly average	**40,961**	**29,095**	**38,911**	**.124**	**71,195**	**666,730**	**98,133**	**45,240**	**166,345**	**82,495**	**318,708**	**9,793**	**9,992**	**13,730**	**29,642**

Editorials

International Committee Under Test

THE upward surge of commodity prices toward the close of 1936 would doubtless have been reflected in rubber prices under free market conditions, but with stocks so reduced by the previous long-continued severe restriction of production that the limited amount of free rubber available was subject to price manipulation, the rise in rubber prices has been particularly pronounced. There is much publicity from London indicating that this result was a matter of surprise to the International Rubber Regulation Committee, but the trade responses to their decisions of October 27 and December 15 were so immediate and decided that to believe it entirely unexpected, in view of the well-known competency of several committee members as rubber traders, is something of a strain on credulity. Granting that misjudgment of the market by the committee did actually occur, a question as to competency of the committee immediately supersedes the question as to the reasonableness of its price aims.

The situation in October was already such as to constitute a test of the competency and intentions of the committee. The situation is now threatening to become such as to constitute a test for the entire administration of restriction. The market fluctuations since December 15 have not been the result of manufacturer-buying; the large users have exerted very little buying pressure since that decision. The price rose in response to speculative demand and continued buying from foreign, particularly European, manufacturers. The moderate statement made, upon their return, by the group of Americans representing the domestic industry at the December 15 meeting, appears to have rested on assurances from the committee and would support a view that the immediate price aims of the committee had been exceeded materially; its market effect was entirely negligible. But rumors of the January 4 meeting of the European divisions of the International Rubber Regulation Committee, coupled with the growing seriousness of the General Motors strike, had their immediate effect in the price decline which terminated January 4. Evidently anticipations were for an additional increase in the export quota, in the absence of which the market has quickly recovered most of the ground lost during the decline. In other words, market appraisal is that the committee can do much to correct the situation, but its January 4 recommendation for expediting exports accomplished nothing. The committee has merely temporized.

These events have introduced worldwide speculation in the trade in rubber company shares and in the commodity. Manufacturers who have rubber in hand or under contract are, temporarily, in far better position than manufacturers without stocks who buy from hand to mouth. National concern is being expressed over the effect not only on manufacturers, but also on ultimate consumer costs; some Malayan and British commentators openly deplore the present high prices, in some cases terming them "a breach of faith;" American comment thus far has been temperate, but patience is wearing thin. But for automobile strike uncertainties, the market would recently have been higher. The committee can no longer claim to be unaware of the situation, and in inactivity or in choosing between effective action and alternatives it is in each case now making a policy decision. Only positive corrective measures can enable it to continue to claim the confidence of consumers in moderation of its aims.

Outside Coercion

STRIKES are historically a part of every period of recovery following those of commercial and industrial retrenchment. That we are now definitely emerging from an economic depression of proportions never before experienced in this country would lead one to expect labor reactions of similar proportions to be attending. In number, size, and span of years over which they are now occurring, however, they would seem to be somewhat beyond our justifiable expectations, and for reasons not deeply hidden or frankly advocated.

The economically serious, individually tragic, and basically unnecessary General Motors strike now in the callous stage of sit-down is an excellent example of the utter and cynical disregard that some labor organizers have for the true welfare of their so-called constituents in their own lust for power, if not actually also for the wealth that they so vociferously decry.

In this despicable episode some 135,000 workers, most of them family heads, have forfeited and are continuing to forfeit many needed millions of wage dollars because a small percentage of their number allow themselves to be led like unthinking sheep into a militant idleness by leaders of questionable motive and trustworthiness. The workers, now perhaps just misguided idlers, are but pawns, sacrificing their means of livelihood and risking life and limb, fighting for an allegedly important stated cause that has little to do directly or indirectly with any real grievance they have with their employe-employer relations, and nothing whatever to do with the unstated motive of their organizing leaders. Workers must think soundly regarding their own best ultimate interests.

What the Rubber Chemists Are Doing

A New Heat Transfer Medium

INDIRECT heating has proved satisfactory in all cases where a heat transfer medium has been available for the particular temperature range and equipment involved. In the rubber industry the hot vulcanization of rubber goods with sulphur is regularly accomplished by steam as the indirect heat transfer medium circulating through press platens, jacketed special containers, or pipe coils. The use of steam for hot vulcanization naturally involves maintaining oftentimes dangerously high steam pressures to cover the curing range of soft to hard rubber. The practical elimination of pressure within the range of rubber curing temperatures is easily possible by employing a material developed for and successfully applied to both liquid and vapor heating systems covering the temperature range from as low as 60° F. up to 750° F. Temperatures as high as 400° F. can be maintained, for instance, with a pressure of only seven pounds; whereas this temperature would require 250 pounds of steam.

This new medium is an eutectic mixture of the organic compounds, diphenyl 26½% and diphenyloxide 73½%. It is liquid at ordinary temperatures, freezing at 53.6° F., as distinguished from its components, diphenyl, which freezes at 154° F., and diphenyloxide, which freezes at 80° F. Neither the liquid nor the vapor is toxic in character. No more precautions need be observed in its use than would be necessary with any other hot vapor at equivalent temperatures. It possesses the characteristic odor of diphenyloxide, similar to that of a geranium plant. This odor warns of any leak in a system. Prolonged exposure to its vapors from neglected leaks may, in some cases, cause slight nausea, which is relieved when the cause is removed.

The material is very stable at all service temperatures and leaves no carbon or sludge deposits on heat exchange surfaces. Moreover neither corrosion nor oxidation results from its use either as a liquid or a vapor. As a result, almost any metal commonly used at the desired service temperatures can be employed. Cast iron is excepted because of possible leakage through porous castings due to the extremely low viscosity of the material. Although an inflammable material, it cannot be considered particularly hazardous, as the possibility of explosion of either the liquid or the vapor is negligible. The liquid has a flash-point of about 215° F., but cannot support its own combustion at this temperature.

Among the many successful applications are: large installations for both the generation and superheating of steam; central heating plants with a distributing system to various pieces of equipment; individual heating and cooling units for chemical reactors; heat storage systems for use in off-peak periods; jacketed reactors and kettles; and high-temperature drier jackets. Among its numerous possible industrial processing applications may be included molding of plastics, rubber products, etc.

Determination of Sulphur in Rubber Compounds[1]

I. Precipitation of Barium Sulphate in the Presence of Picric Acid

C. Herbert Lindsly[2]

PROBABLY no single operation in analytical chemistry has received more attention from investigators than the precipitation of barium sulphate by means of a soluble barium salt for the determination of barium sulphate. The literature on this subject is voluminous, and the conclusions reached by different investigators as to the proper procedure to employ in order to obtain a precipitate which will be filterable and reasonably pure are highly contradictory. The procedure which seems to be in most general use at present for the determination of sulphate is that of adding barium chloride solution to the hot sulphate solution very slowly, stirring vigorously meanwhile, then allowing the whole to digest at an elevated temperature for several hours before filtering.

For several years it has been known to a few analysts that the presence of picric acid in the sulphate solution at the time of precipitation would yield a precipitate which could be filtered immediately without the necessity of prolonged digestion before filtration. This bit of information has not appeared in the literature, and at present picric acid is being used in a number of laboratories throughout the country. Thus, the author does not claim in any sense that the use of picric acid is original with him, but presents this study in the hope that its use will become as widespread as it deserves.

The technic employed in the use of picric acid is simple. From one to five cubic centimeters of a saturated solution of picric acid in water are added to the acidified sulphate solution and stirred in before adding the barium chloride. The barium chloride may be added quickly, as nothing is gained by adding it slowly. After adding the barium chloride (which should be in excess as small as practicable) the solution should be gently boiled from five to ten minutes. It will then be ready to filter. In case the sulphate solution contains large quantities of sodium salts, as in sulphur determinations on Parr peroxide bomb residues, or strong oxidizing acids, as in the perchloric acid method for total sulphur in rubber compounds, the amount of picric acid necessary to produce the desired effect may be greater than that given above, and in these cases from ten to 25 cubic centimeters of the saturated solution should be used.

In the company's laboratories picric acid has been in constant use for the past eight years in the determination of free sulphur in rubber compounds by the bromine-oxidation method and of total

[1] Presented before the Division of Rubber Chemistry, Akron, O., Oct. 1, 1935. Abridged from *Ind. Eng. Chem.* (Anal. Ed.), May 15, 1936, pp. 176-80.

[2] General Laboratories, United States Rubber Co., Passaic, N. J.

sulphur by oxidation with perchloric acid. It has been known all this time that its use greatly improved the filterability of the precipitated barium sulphate without deleterious effect on the quantitative results, but no systematic study of the results was made until within the past few months.

It has been the author's experience that, in every case, the particle size of the barium sulphate precipitates has been materially increased by the presence of picric acid. It is not recommended in any sense as a cure-all for filtration troubles with barium sulphate, but its use will save a great deal of time and trouble if properly applied to the particular type of sulphur determination in question.

New Du Pont Colors

E. I. DU PONT DE NEMOURS & CO., INC., through its rubber chemicals division at Wilmington, Del., has recently announced two new rubber dispersed colors as being available.

Du Pont Rubber Blue PCD is identical chemically with Monastral Blue, which aroused widespread interest some months ago. Du Pont Rubber Green BD is a blend of Blue PCD and Yellow OBD.

General properties of these two colors are reported to be as given below. Curing properties with open steam, ammonia, cold cure, or in hard rubber are good, but the colors have no effect upon the cure of the mix. Light fastness of Green BD is good and Blue PCD is excellent. Migration rates none, and cracking is slight in both colors. Specific gravity of Green BD is 1.18 and of Blue PCD is 1.17. Bleeding tests in boiling water or 10% soap solution show no change. Stearic acid makes Green BD slightly brighter and has no effect on Blue PCD. Bomb aging of Green BD is satisfactory and of Blue PCD is fair. The soap dish test discolors Green BD, but does not affect Blue PCD. The effect of lime in a press cure makes both colors slightly duller, but stronger, while in open steam cure it makes Blue PCD duller, but Green BD duller and stronger.

Perkin Medalist

THOMAS MIDGLEY, JR., vice president, Ethyl Gasoline Corp., New York, N. Y., January 8, was awarded the Perkin Medal for 1937 "for distinguished work in applied chemistry, including the development of anti-knock motor fuels and safe refrigerants." The presentation was made at a meeting of several affiliated chemical societies, including the New York Section of the American Chemical Society, under the auspices of the American Section of the Society of Chemical Industry, at the Chemists Club, 52 E. 41st St., New York.

A. C. S. Activities

New York Group

B. BRITTAIN WILSON, business manager of INDIA RUBBER WORLD, has been appointed secretary-treasurer of the New York Group, Rubber Division, A.C.S. Mr. Wilson's election followed the resignation from that post of D. C. McRoberts, formerly editor of INDIA RUBBER WORLD, who has since become assistant to the president of the Kaysam Corp. of America. The appointment of Mr. Wilson was announced by Chairman J. Miscall, following a mail vote by the executive committee of the group.

Los Angeles Group

THE Los Angeles Group, Rubber Division, A. C. S., held its monthly meeting January 5 at the Los Angeles Athletic Club, with a record attendance of 93. The new officers put on an unusual and varied program.

F. H. Banbury, of Farrel-Birmingham Co., Inc., talked on "New Aspects of Banbury Mixing," giving a brief discussion of new developments and uses for this famous unit in other industries as well as rubber.

Carl Knoppf, archeologist, at the University of Southern California, delved into the past and gave an historical background of the evolution of our alphabet and modern writing. This included the deciphering of several inscriptions on tablets dating back to 3000 B.C.

Zeno Klinker exhibited a motion picture, "Man's Conquest of the Air," considered the most complete and comprehensive collection of authentic historical aviation films in the world.

As a going away gift, W. R. Hucks, who has been transferred to the Oaks, Pa., plant of The B. F. Goodrich Co., was presented with a book entitled "Rubber." It was suggested that "Huck" read this on the first Tuesday of every month and review the names of all those present who autographed the book. Purely a coincidence, Mr. Hucks also won the raffle for a completely equipped traveling case, donated by K. Ellsworth, of U.S. Lime Products Corp.

The lucky winners of door prizes contributed by E. H. Lewis, of Pequanoc Rubber Co., were R. L. Dignola, of National City Turpentine, and Harry Maddock, of Rubber Art & Mold Co. Cigars were distributed through the courtesy of J. M. Huber, Inc.

New York Section

NEW YORK SECTION, American Chemical Society, held election of officers last month, with the following results: chairman, Dr. D. P. Morgan, chemical economist of Scudder, Stevens & Clark; vice chairman, Dr. Duncan A. MacInnes, of the Rockefeller Institute for Medical Research; secretary, Dr. Cornelia T. Snell; treasurer, C. R. de Long, of Amusol Corp. Dr. Morgan also will head the section's board of directors, and serving with him are the other officers and Professors Arthur W. Hixson, of Columbia University, A. B. Newman, of Cooper Union, and Wm. C. Mac Tavish, of New York University.

Nevillite

A NEW colorless and transparent inert hydrocarbon resin is being marketed for use in varnishes, enamels, or exterior coatings. Brittle at room temperatures, it is thermoplastic by nature and although chemically inert with pigments and fillers, it is reported to display the following characteristics: resistance to acids, alkalis, alcohol, and water; transparency and stability against discoloration; freedom from taste and odor; solubility in petroleum solvents, aromatic solvents, higher minerals oils, drying oils and thinners ordinarily used in the coatings industry; and its neutral effect upon the geling tendency of chinawood or other oils while being cooked.

Although this resin apparently has not been tried in rubber compounding to any great extent, the manufacturer believes that it possesses some of the same properties as found in other frequently used resins in addition to its color stability and plasticity effect and states that it should be desirable for high grade white rubber goods.

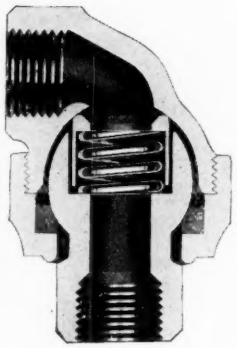
A. S. T. M. Meeting

American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa., will hold its 1937 Regional Meeting at the Palmer House, Chicago, Ill., March 2 and 3. Group meetings of the society's committees will be held at the same place March 1 to 5. The feature of the Regional Meeting will be a symposium on lubricants (five papers) and on corrosion testing (six papers). The society will hold its fortieth annual meeting and Fourth Exhibit of Testing Apparatus and Related Equipment, June 28 through July 2, at the Hotel Waldorf-Astoria, New York, N. Y.

S. C. I. Meeting

The Society of Chemical Industry, American Section, will hold a meeting on February 19, 1937, at 7:30 p. m. at The Chemists' Club, 52 E. 41st St., New York, N. Y. James G. Vail will preside over the meeting at which Dr. Wallace P. Cohoe is to be the guest speaker. His paper is entitled "Permanent Sizing with Alkali Soluble Cellulose Ethers." A dinner will precede the meeting, starting at 6:00 p. m.

New Machines and Appliances



Non-Leaking Flexible Ball Pipe Joint

Roto-Flex Joint

THE sectional view shows a ball joint extensively used in steel plants and now available to the rubber industry in types suitable for use on vulcanizers. The ball member is flexibly supported in a free socket and in contact with the gasket at all times; thus changes of temperature from hot to cold do not affect it. The ball in service moves with a minimum of internal friction and side play or flex is obtainable in any degree in addition to rotary movement.

All parts, except the stainless steel spring, are of high-grade bronze. The gasket, a special hard asbestos composition, gives long life on the severest kind of service. Pittsburgh Brass Mfg. Co., Penn Ave. at 32nd St., Pittsburgh, Pa.

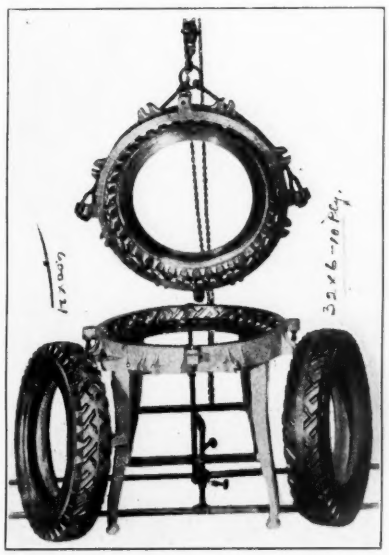
Turbine Sifter

THE centrifugal method of sifting compounding ingredients utilizes a principle which does away with vibrating, shaking, or pulsating action and tends toward clean, quiet, and efficient action through the enclosed, power driven blades which distribute the material against the inner surface of a vertical cylindrical screen. The material to be sifted is fed through a hopper at the top, becomes mixed with air drawn in by suction from the turbine blades, and is delivered at the bottom as fines or tailings. The blades are of varying profile so as to spray the material uniformly over the screen, and the absence of brushes eliminates the possibility of contamination or clogging of the mesh by bristles.

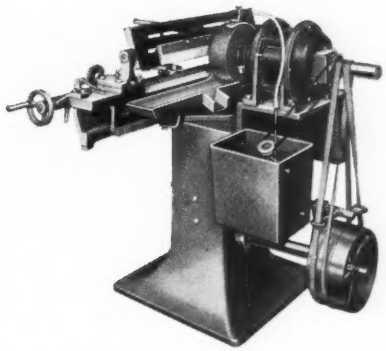
Varying sizes of sifters are available, and the illustration shows No. 2 double turbine sifter, which occupies floor space 30 by 30 inches, is 66 inches high, and has a capacity of from 500 to 5,000 pounds per hour, depending upon the nature of the material to be sifted. Screens from 6 to 300 mesh can be used.

Motor Driven Turbine Sifter

Cleaning the machine and changing screens can be accomplished easily. This type of sifter is being used at present by some rubber and chemical manufacturing companies, and in addition to the sifting operation there appears to be a possibility of using it for blending different ingredients fed into the hopper simultaneously. Abbé Engineering Co., Inc.



Miller Heavy Duty Retread Mold



Rogers Flat Knife Grinder

Automatic Knife Grinder

A STURDY grinder for thick carbon or thin high-speed woodworking knives enables perfect grinding control through a knife table provided with quick set up gages for true knife adjustment, through a positive bevel stop which sets the knife at correct guiding bevel, and through automatic traverse feed of the carriage in conjunction with positive automatic cross feed of knife to the grinding wheel. The feed speed is variable with provision for automatic stopping the cross feed, and the reversing mechanism is adjustable to suit the length of knife being ground.

Rogers Type F grinder is suitable for knives from 26 to 54 inches in length and is regularly equipped with an eight-inch diameter cup grinding wheel covered by a guard adjustable to the wear of the wheel.

The knife table, slotted for gages and clamps, travels on self-alined "V" ways and bearings, and the bed is easily swiveled so as to permit concave or flat bevel grinding. This grinder can be obtained with direct connected motor drive or with tight and loose pulleys for belt drive. Samuel C. Rogers & Co.

Truck Tire Retread Mold

IN RESPONSE to popular demand the full circle mud and snow retread mold has been designed. On the model shown 10 popular sizes of truck and balloon tires can be retreaded. In the picture is seen a 32 by 6.00 10-ply heavy-duty truck tire (right) retreaded in this mold, also a 6.00 by 21 truck balloon tire (left).

The tread design in the mold is 16/32-inch deep and requires rubber at least 18/32 to 20/32 thick on the crown to re-

tread. Tires produced in these molds will hold in mud, snow, on slippery streets or roads just as well without skid chains or better than the regular tire will with skid chains. As skid chains are very expensive, cause much trouble, and are short lived, people in general are interested in a mud and snow tread tire that can be used in winter without chains. As these retreads have a rib in the center, they can be used on the rear wheels of a car or truck in the summer to good advantage and make driving safer on slippery roads. Chas. E. Miller Corp.

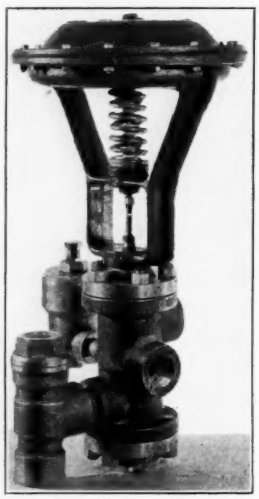
Two-Pressure Valve

SUMMIT valves for controlling the operation of hydraulic presses are built in one unit to operate the low-pressure line and high-pressure line up to 3,500 pounds. The parts of the main operating valve are opened by 25 pounds of air pressure in the diaphragm top, admitted through a ¼-inch three-way air cock, and are closed by a medium weight spring. The diaphragm is made of sheet rubber with a double-ply fabric insert. Inward parts can be removed without taking the main valve from the pipe line, and the construction does not include stuffing boxes, but is such that loss of water does not occur when the valve is changed from the open to the closed position. These valves can be equipped with automatic cycle controllers, in which case the high-pressure inlet valve is automatic, or the valves can be manually controlled by the operator, in which case the high-pressure inlet valve is controlled by a diaphragm. Industrial Instrument Co.

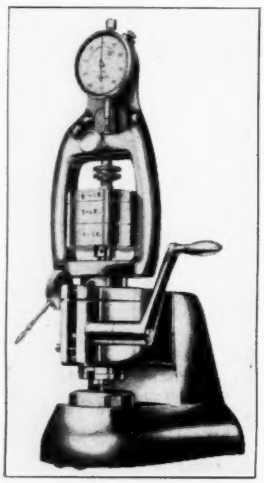
Precision Belt Press

STRUCTURAL features recently introduced into belt press design aid in the natural elongation during vulcanization, yet prevent unequal stresses during the periods of vulcanization or pressure release. The follower plate of Mechanite, anchored longitudinally midway between the ends and laterally near the ends, is free to expand and contract in a straight line in both directions from the midway point, but is not free to move lengthwise in its entirety. The hydraulic belt clamp mounted on trunions attached to the follower plate, is so designed as to minimize unequal stresses and thereby tend to provide long and accurate service.

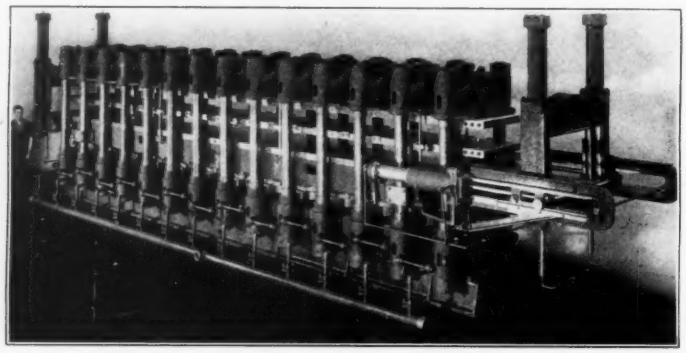
The plates, drilled to insure uniform heating and fitted with gasket-type plugs, are air and water cooled at the ends to provide a gradual decrease of temperature from the curing area to the ends. Farrel-Birmingham Co., Inc., Ansonia, Conn.



Automatic High Pressure Valve



Federal Penetrometer



Farrel-Birmingham Belt Press

Hardness Testing Gage

THIS hardness tester was designed in accordance with A.S.T.M. standards, for determining the hardness of rubber, cork, felt compositions, and similar materials. The gage is so designed that a true determination of the amount of penetration is obtained. Variations caused by surface irregularities are eliminated by pressing the material first by a fixed amount and then allowing the penetrating point to find its own resting point. Constant pressure is maintained throughout the test by weights.

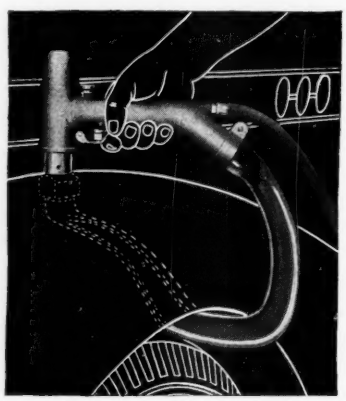
The movement of the pressure members is simple and convenient to operate, thus facilitating the making of tests. Other anvils than flat can be furnished if required.

Referring to the illustration, the penetrating point is seen just above the anvil. This point exerts a certain known pressure as it enters the sample. Just above this point a flat anvil is shown. This is brought to rest on the surface of the sample under a certain known weight and clamped in the at rest position. The penetrating point is then released, and the amount of penetration read on the dial. Weights are made to conform to A.S.T.M. standards and can be adapted to other standards. Federal Products Corp., 1144 Eddy St., Providence, R. I.

Pneumatic Hammer

THIS device is of two-fold interest to rubber manufacturers: first, it embodies the use of air hose; and second, it may prove to be a handy tool in the machine shop or for forming special metal guards or patterns. The new De Luxe Model, weighing 14 pounds, can be manipulated with one hand and can be used with any standard air compressor delivering 75 pounds' pressure. The hammer starts at the pressure of a trigger and, al-

(*Continued on page* 58)



Weaver Pneumatic Hammer

New Goods and Specialties

Manhattan "Rub-Roc" Press Roll

New Top Press Roll

THE latest contribution to better paper making is the new "Rub-Roc" top press roll recommended as ideal for top press and smoothing press service. The "Rub-Roc" roll is of specially prepared rubber compound which eliminates the tendency to adhere to the sheet. Because of this repellant quality the sheet is instantly released. Other advantages are that felt wear is decreased and crushing of the sheet is avoided. The manufacturer guarantees this new roll not to pick-up or crack in service. In appearance the new roll is distinctive with a mottled red and black surface.

Extensive laboratory tests and field trials on various grades and weights of paper have been made, and as a result, "Rub-Roc" rolls are now announced to the paper industry as an improved and more efficient top press roll. The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Inflatable Shade

AN INFLATABLE shade for electric light bulbs[1] is a novel adaptation of the familiar rubber toy balloon. An object of the invention is to provide an attractive, cheap, unique, and readily applied enveloping shade or cover for electric light bulbs to secure a highly ornamental display admirably adapted for advertising purposes, lawn parties, parks, carnivals, holidays, festivals, and general decorative purposes, whether night or day, indoors or out.

The uninflated form of the shade is shown in Figure 1, and applied and inflated in Figure 2. It consists of a sack, 4, to be reversed upon the electric light bulb and fastened in that position by a string or wire tie, 6, passing through lugs, 7. Thus attached, the balloon portion, 2, is inflated by air to desired size through the neck, 3, and the inflation retained by a tie applied to the neck. The article is produced by the dipping process and admits of all the variation in form, coloring, and printed advertising usual in toy balloons.

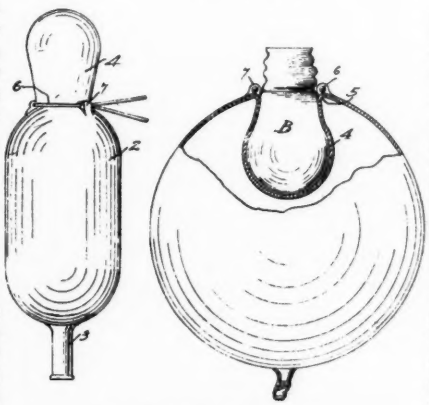
[1] Patent applied for.

Flexlock Rubber Joints

FLEXLOCK pipe joints for coupling stoneware bell-and-spigot pipe is a new development for use with chemical stoneware. The joints are molded rubber rings having internal and external circumferential ribs which grip the pipe and its spigot. They assemble easily to form a perfect joint, with the following advantages: namely, positive seal, flexibility, ease of installation, permanence, low cost installation, unaffected by any fluid except hydrofluoric acid or solutions over 150° F., permit use of bell-and-spigot pipe on pressure lines. Flexlock installations, like all other flexible joint lines, must be rigidly supported. They are not designed for those applications where frequent disassembly is necessary; however the joints admit of being simply and safely taken apart. The United States Stoneware Co.

Electric Comforter

WINTERTIME sufferers who either wear themselves out beneath a heavy load of blankets or wake shivering under too few will welcome the new electric comforter developed by W. K. Kearsley of the General Electric research laboratory. Plugged into a household circuit, the electric comforter obviates the necessity of any other form of covering, yet automatically keeps the sleeper comfortably warm regardless of any changes in the temperature of the room. Unlike ordinary heating pads, the comforter will give a gentle warmth over a large area, replacing the heat loss from the bed. It is not designed to give concentrated heat at any given point.



Inflatable Rubber Shade

Flexlock Pipe Joint

The comforter consists of two thicknesses of a lightweight material. Between these many feet of fine, flexible conducting wire have been sewed in zig-zag pattern. Both ends of the wire are brought to a terminal at the end of the comforter which is used at the foot of the bed. From this terminal a cord leads to a small control box containing an adjusting mechanism, a thermostat, and a transformer. This box may be placed on a night table and plugged into a convenient outlet. On the box is an on-and-off switch and a control knob that regulates the amount of heat produced by the comforter. A scale, visible through a window in the box, shows red if the rate of heating is increased and green if it is decreased.

This comforter has several safety features. It cannot get too hot, or can a person get an electrical shock from it. A transformer in the control box changes household current to 23 volts and makes the comforter a safe, low-voltage device. The exceedingly pliable wire used as the heating element is insulated with a special rubber insulation. Inside the comforter are several small thermostats capable of opening the circuit and shutting off the current in case unusual temperatures result from such abnormal usage as piling up or rolling the comforter while the current is on. Once a user has set the rheostat on the control box at the desired place, the main thermostat will maintain that temperature regardless of changing weather conditions. Should the temperature in the room drop, the sleeper does not have to get up for more covers or even awake and make a further electrical adjustment, as this change is compensated for automatically.

Electric comforters have been made in both single- and double-bed sizes. The length of material necessary for tucking in is not heated. The comforter can be washed like a blanket. The electrical energy consumed depends upon the room temperature. Research men concerned in the development say the comforter will cost approximately 4¢ a night to operate.

Rubber Industry in America

OBITUARY

Wm. B. Ruston

AFTER more than a year's illness William B. Ruston, 57, Philadelphia, Pa., division sales manager, Dunlop Tire & Rubber Co., Buffalo, N. Y., died January 8. A native of Montreal, P. Q., Canada, he began his long service with the rubber industry in 1897 when he became an errand boy for The B. F. Goodrich Co., Akron, O. Promotions followed, and in five years he was made assistant branch manager at Philadelphia. Eight years later he resigned to market tires for Lee Tire & Rubber Co., Conshohocken, Pa. Next he joined the Thermoid Rubber Co., Trenton, N. J., as traveling representative. After five years he accepted a similar position with the Dayton Rubber Mfg. Co., Dayton, O., and eventually was put in charge of the entire sales force. He left that post in April, 1919, to help form The Master Tire & Rubber Co., Dayton, of which he became president and general manager. When a receiver was appointed to the firm a few years later, Mr. Ruston continued as director of sales. He had been with Dunlop many years.

The deceased belonged to Stephen Girard Lodge, No. 450, F. & A. M., Philadelphia Consistory, Lu Lu Temple, and the Shrine Club.

Funeral services were held January 13.

Surviving are his wife, a son, and two daughters.

R. S. Burdette

RICHARD STUART BURDETTE, for 17 years with the Goodyear Tire & Rubber Co., Akron, O., died recently. His first work with the company was in the experimental department. He had some solid tire experience and also served on rim sales for several years. For some time he had charge of the development of pneumatic industrial and bicycle tires.

Mr. Burdette was born in Edgewater, N. J., 52 years ago. He was graduated from Columbia University as a mining engineer and then spent some time in Mexico on such work.

He leaves his wife, a son, and a daughter.

Lorin T. Lyle

AFTER a long illness Lorin T. Lyle, assistant counsel, Firestone Tire & Rubber Co., Akron, O., died January 11. He was born at New Holland, O., May 20, 1896. After graduating from Ohio State University he practiced law

Lorin T. Lyle

in Columbus for three years, then joined the Firestone legal department in July, 1919.

He is survived by his wife, a daughter, and his mother.

Funeral services were held January 14 at St. Vincent's Church, Akron.

Wm. H. Grady

AFTER a brief illness William H. Grady, for 30 years foreman of the golf ball department, United States Rubber Products, Inc., Providence, R. I., died January 8. He was also prominently identified with Providence Aerie No. 99, F. O. E. and Sons of Veterans of Chelsea, Mass.

Surviving are his wife, five daughters, five sons, and a sister.

A high requiem mass was sung January 11. Interment was in Holy Cross Cemetery, Malden, Mass.

J. Mont Miller

J. MONT MILLER, for twenty years with Lee Rubber & Tire Corp., Conshohocken, Pa., died early last month. At one time he was field director for Lee and later was made manager of its Youngstown branch. He was superintendent of the tire department of the Republic Rubber Co., Youngstown, O., when it was taken over by Lee.

Mr. Miller, born in Mercer Co., Pa., November 16, 1876, belonged to Evergreen Presbyterian Church; Youngstown Lodge No. 35, B.P.O.E.; Western Star Lodge No. 21, F. & A. M.; Youngstown Chapter 93, R. A. M.; St. John's Commandery No. 20, Knights Templar, Scottish Rite bodies and Al Koran Temple. He was especially active in Masonry, having reached the 32nd degree and having held virtually every office.

The deceased leaves his wife, three brothers, and a sister.

Richard H. Noble

RICHARD H. NOBLE, 65, treasurer and one of the founders of Noble & Westbrook Mfg. Co., manufacturer of rubber and metal stamps, East Hartford, Conn., died January 15. The deceased, a leader in the civic and industrial development of East Hartford, leaves his wife, four sons, and two daughters.

Health Exercise

WITH one good lung and a supply of toy balloons, a young man of 21 literally blew himself back to health. Every half hour he inflated a balloon to restore to normalcy a lung damaged in an auto accident.

Blowing exercises to restore injured lungs are frequently prescribed by physicians. Standard practice has been for the patient to blow through a tube to force water from one jar to another. But many patients find blowing balloons a lot more interesting. *The Oak Leaf.*

Pneumatic Hammer

(*Continued from page* 56)

though it delivers 4,000 blows per minute at full speed operation, it will stop instantly upon release of trigger pressure.

Although the hammer, two arms, and four dies were designed solely for automobile body and fender straightening, the high-speed hammer produces results difficult to duplicate by hand and such as should often be helpful in metal pattern forming. It can be used for shaping metal approximately twice the thickness of an automobile fender. Dies suitable for various curves and surfaces found on an automobile should suit most requirements in a pattern or manufacturing department.

There are only two moving parts in the hammer head mechanism, the striker moving inside a floating piston or guide; and because of the construction of the floating piston, no jaws are necessary to guide it, thus resulting in easier movement of the hammer along the metal surface. Weaver Mfg. Co.

EASTERN AND SOUTHERN

AT PRESENT this nation is well along the road of recovery; while the rest of the world is farther ahead. Recoveries, like depressions, once started, acquire momentums almost physical in quality. This fact warrants one authority reaching some general conclusions about business prospects for 1937 despite our new condition of managed economics. The conclusion that seems justified is that general business will be better in 1937 than in 1936 despite the unrest throughout the world, the labor difficulties here, and the new legislation that Congress may enact.

In 1937 also will be a continuance of much replacement of needs developed during depression years. There will likewise be a strong demand for materials to keep abreast of current trends, particularly in machinery. This activity will maintain production at a high rate.

Machine tool orders in December were the highest of any month on record. Several reasons contributed to this great volume of orders: rising trend of machine tool prices; customers' desire to get modern equipment to reduce production costs; recent delays in delivery prompting producers to order well in advance; beginning by industry of its long postponed move to replace obsolete machines and related equipment in plants.

A darker side of the picture, however, exists. Several disturbing factors threaten the bright outlook for 1937. There will be a continuation of labor troubles. Rising costs furthermore, will influence business earnings. Higher taxes, higher wages, and higher material costs are part of the problem confronting management this year. Also, 1937 will see more business failures. Despite the heavy absorption of workers by industry it is estimated about one-fifth of the working force of the country is still unemployed.

Vulcanized Rubber Co., Morrisville, Pa., reports 1936 was a very prosperous year. Prospects for a good season during the present year are bright.

Freeport Sulphur Co., 122 E. 42nd St., New York, N. Y., has leased 1,800 acres in Harris County, Tex., which have indications of sulphur deposits. The property, known as the Hockey Dome, was leased from the Stanolind Oil & Gas Co., Tulsa, Okla. Drilling operations are scheduled to start in less than sixty days to test its possibilities.

Benefits will accrue to employes of Freeport Sulphur not only under the Social Security Act, but also from continuance of the company's established pension plan, according to a recent announcement by President Langbourne M. Williams, Jr.

Robert Badenhop

Robert Badenhop, president of Robert Badenhop Corp., 233 Broadway, New York, N. Y., sailed January 10 for the Far East, where he will visit his firm's numerous connections in the crude rubber producing centers of Malaya, Ceylon, Java, Sumatra, and Indo-China. While in the East, Mr. Badenhop, who is also president of the Rubber Trade Association of New York, Inc., will call upon the officials of the several crude rubber associations located in the primary markets. Mr. Badenhop is accompanied by Mrs. Badenhop and Robert A. Badenhop, his eldest son. The party will return by way of China, Japan, and Honolulu and will arrive in San Francisco late in June.

Virginia Rubatex Corp., manufacturer of hard and soft cellular rubber products, has purchased from the Bedford Tire & Rubber Co., Bedford, Va., the factory building and equipment which the corporation had been using under lease for 18 months. Machinery now in use will be replaced or supplemented with new and modern machinery and equipment, which will enable the plant to go into regular production soon. Wesley L. Smith, vice president and general manager, stated his company has leased the exclusive rights to manufacture, under the Rubatex patents, rubber goods for land and sea aircraft, goods for use in athletics, small household articles, and to produce sheet rubber under a lease shared by other companies, from the parent company, Rubatex Co., New York, N. Y. Already enough orders are on file to keep the plant busy until well into the summer. Head offices of the Virginia Rubatex Company are at Newark, N. J., and other executives include Stanley Odlum, president; Margaret Mully, secretary, and Norman Hamer, factory superintendent.

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y., has acquired the business and plant of Chas. H. Stone, Inc., Charlotte, N. C. Its operations will be merged with those of American Cyanamid's southern district. The increase in warehouse and production facilities in the South, on the one hand, combined with a more comprehensive range of chemicals and allied materials together with extensive research facilities, are now placed at the disposal of customers of both organizations. The Charlotte district will be under the direction of Paul F. Haddock, southern sales manager, and Chas. H. Stone, Charlotte district production manager. The Charlotte office will be transferred to and the business of the southern district conducted from 822 W. Morehead St. It is requested that all orders, inquiries, and correspondence be directed to P.O. Box 1067. Telephone numbers: Charlotte 6129 and 3-4115; Long Distance 942 and 981. The Greensboro, N. C., warehouse will be continued at 125 Walker Ave., and the Greenville, S. C., warehouse at 409 Westfield St.

Fenner & Beane, member of leading exchanges, 67 Broad St., New York, N. Y., has announced a new branch office at Corpus Christi, Tex., formerly E. M. Wilson & Co., with W. Douglas Cooper, Jr., manager. The firm will also open a branch in Fort Wayne, Ind., under the management of W. D. Criswell. Fenner & Beane recently prepared its 1937 winter directory, showing its branches and other wire connections throughout the United States and Canada.

Foster D. Snell, Inc., consulting chemist and chemical engineer, 305 Washington St., Brooklyn, N. Y., held its annual dinner January 12 with 24 members of the organization present and four absent. Toastmaster Ray Hedman introduced as speakers Leon V. Quigley, Dr. Foster Dee Snell, president of the concern, and Cyril S. Kimball. Mr. Quigley reviewed the important events of the past year in terms of newspaper headlines. Dr. Snell then reviewed the past year in terms of the activities of the corporation. Improvement has far outstripped the general business improvement because research tends to be unduly reduced in a period of depression. Following this he predicted further but less abrupt increase in 1937. The dinner closed with a few words by Mr. Kimball.

Dr. Snell, honorary secretary of the American Section of the Society of Chemical Industry since March 20, 1925, resigned this office at the Perkin Medal meeting at The Chemists' Club in January. Cyril S. Kimball was then elected honorary secretary of the American Section.

Commodity Exchange Election

The board of governors of Commodity Exchange, Inc., 81 Broad St., New York, N. Y., at a meeting January 21 reelected for his second term Floyd Y. Keeler, of Orvis Bros. & Co., 60 Broadway, New York, the second president of the exchange.

Martin H. Wehncke was reelected treasurer of the exchange.

Among the new vice presidents elected is Charles T. Wilson, of Charles T. Wilson Co., Inc., 99 Wall St., New York. He succeeds Wm. E. Bruyn as vice president of the Board rubber trade group. Mr. Wilson was an organizer of the former Rubber Exchange of New York in 1926, served as one of its governors since its inception, and was at one time a vice president. He has been a governor of Commodity Exchange since its beginning, May 1, 1933.

National Association of Waste Material Dealers, Inc., Times Bldg., New York, N. Y., has announced that through the courtesy and cooperation of E. J. Keller, the New York N.A.W.M.D. Luncheon Club has arranged to hold its monthly luncheons at the Aldine Club, 200 Fifth Ave., New York, in one of the club's largest private dining rooms The January luncheon took place on the nineteenth.

Arthur D. Little, Inc., research chemist and engineer, Cambridge, Mass., has leased space at 420 Lexington Ave., New York, N. Y.

The 1937 National Automobile Show will be held in New York, N. Y., October 27 through November 3, according to Alfred Reeves, vice president of the Automobile Manufacturers Association and show manager. The opening will be two weeks in advance of the 1936 show. Mr. Reeves explained introducing new models at national shows in the fall, begun in 1935, had proved so successful in stabilizing employment that it was decided to continue it, and that the advancing of the opening date from November into October would be helpful to the dealer shows throughout the country, usually held in the former month.

E. I. du Pont de Nemours & Co., Inc., R. & H. Chemical Department, Niagara Falls, N. Y., has awarded a contract for the erection of a fireproof factory on Buffalo Ave.

Wm. Stansfield Calcott, director of du Pont's Jackson Laboratories, was among the guest speakers at the memorial exercises January 10 at Notre Dame, Ind., for Rev. Julius A. Nieuwland, C.S.C., of the faculty of Notre Dame, whose researches led to the development of synthetic rubber.

Pennsylvania Rubber Co., Jeannette, Pa., effective January 1 gave its employes their third general wage increase within ten months. Approximately 1,100 workers were affected.

U. S. Rubber Notes

United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., has contributed $216,000 to the company's service and pension fund as of December 31, 1936. It will be available April 1. Total distribution will be about $271,000. Direct cash expenditures for the benefit of employes during 1936, aside from wages and salaries, total well over $1,200,000. The items include the following: for pensions and disability allowances under the company's pension plan, $565,000; for unemployment insurance under the federal and various state laws, $380,000; first contribution to the service fund, $55,000; second contribution to the service fund, $216,000. Expenditures during 1937 will include the usual pension payments, a contribution for unemployment insurance and an additional payment of approximately $380,000 for federal old age pensions. Also, all factory employes will receive one week's vacation with pay, a value in money of upwards of $500,000. On September 30 a total of $2,273,908.35 stood to the credit of employes in the retirement and savings plan, the retirement fund amounting to $1,891,112.14 with a total of $750,150.26 in the savings account, with earned income of $50,281.17 and a reserve for contingencies fund of $36,789.98.

The company has leased for several years a two-story brick building, 50 by 230 feet, at 727 Union, Memphis, Tenn.

The company also will erect a steel structure 14 by 10 feet on the roof of a building at 355 Valley St., Providence, R. I., to be used as a conveyer and dryer. U. S. Rubber has also commenced a specially constructed foundation for an acid tank.

From the activity standpoint, the Bristol plant of U. S. Rubber Products has enjoyed its best year since 1929, according to Factory Manager Ernest G. Brown. The plant now employs 600 persons, an increase of about 100 over the 1935 personnel. Most of the departments, on a 40-hour-week schedule, operate on a three-shift basis.

"The period just completed is substantially more active than the period at the same time last year," Mr. Brown said. The management expressed optimism about the 1937 outlook and expects continued steady operating during the year.

Cyrus Ching, director of industrial relations, U. S. Rubber, on January 14, addressed the Industrial Foremen's Club, Waterbury, Conn., on "Employer-Employe Relations."

Webster Norris, associate editor of India Rubber World, left early in January on an extended leave of absence for reasons of health. With Mrs. Norris he is sojourning in Florida, where he plans to remain several months to avoid the northern winter. Upon his return he plans to resume his activities with his publication.

Greetings, Calendars, and Souvenirs

The staff of India Rubber World acknowledges with thanks the following holiday mementos.

From Godfrey L. Cabot, Inc., Boston, Mass., came swanky individual fountain pen desk sets.

Individual desk memo pads were forwarded by General Tire & Rubber Co., Akron, O.; and The Vultex Chemical Co., Cambridge, Mass.

H. Muehlstein & Co., Inc., 122 E. 42nd St., New York, gave a neat wallet.

An interesting pocket memorandum book was sent by John Royle & Sons, Paterson, N. J.

Attractive greeting cards came from Cia. Hulera Industrial Mexicana, S. A., Mexico, D. F., Mexico; The Cleveland Liner & Mfg. Co., Cleveland, O.; Davol Rubber Co., Providence, R. I.; J. C. Brown, of The Gates Rubber Co., Denver, Colo.; Carl J. Wright, of General Atlas Carbon Co., 60 Wall St., New York; Dean M. Warren, of General Electric Co., Nela Park, Cleveland; Robert E. Powers, of The B. F. Goodrich Co., Akron; H. H. Heinrich, of H. H. Heinrich, Inc., 200 Varick St., New York; H. E. Howe, of *Industrial Engineering and Chemistry,* Washington, D. C.; Frederick J. Maywald, F.C.S., 309 Hoboken Rd., Carlstadt, N. J.; David C. Scott, of Henry L. Scott Co., 101 Blackstone St., Providence; Ernest W. Beck, of United States Rubber Co., 1790 Broadway, New York; and W. W. Higgins, of United Carbon Co., 350 Fifth Ave., New York.

Useful calendars were forwarded by American Zinc Sales Co., Columbus, O.; Cleveland Liner & Mfg. Co.; Fremont Tool & Die Co., 432-38 N. Wood St., Fremont, O.; General Electric Co., Schenectady, N. Y.; Imperial Paper & Color Corp., Glens Falls, N. Y.; Link-Belt Co., 2045 W. Hunting Pk. Ave., Philadelphia, Pa.; Northwestern Rubber Co., Litherland, Liverpool, England; The Oak Rubber Co., Ravenna, O.; National Rubber Machinery Co., Akron; Cia. Hulera Industrial Mexicana, S. A.; S. A. Fabrica Argentina de Alpargatas, Buenos Aires, Argentina; and C. K. Williams & Co., Easton, Pa.

The Witco Carbon Co., 295 Madison Ave., New York, N. Y., has appointed C. R. Johnson technical director and Carl J. Minnig general sales manager. Mr. Johnson has had wide experience in the rubber and carbon black industries. He was chief chemist and then manager of the development department, Goodyear Tire & Rubber Co., Akron, O.; technical director, Godfrey L. Cabot, Inc., Boston, Mass.; and eastern sales representative, Philadelphia Rubber Works Co., Akron. Mr. Minnig has served successfully many oil and carbon black companies and since 1921 had been in charge of natural gas products and carbon black production at the Phillips Petroleum Co., New York.

Rubatex Products, Inc., 277 Park Ave., New York, N. Y., sold to F. W. Peel and associates Expanded Rubber Co., Ltd., London, England. Rubatex took the London concern over about a year ago, and the two firms have an interlocking patent agreement. Rubatex acquired the fundamental Denton patents and others having to do with the process of manufacturing cellular rubber products.

Rubatex also has licensed Sponge Rubber Products Co., Derby, Conn., to manufacture cellular rubber products. S. E. Kienitz is managing the installation, production, and sales of this business for the Derby concern.

Camel Back Dies

Retreaders throughout the United States will welcome with a deep sense of relief the following industry program on camel back stock issued by the Committee on Tire Accessories and Repair Materials of The Rubber Manufacturers Association.

Standard Nomenclature

In the past no two rubber companies used the same system of die numbers. Now, under the new program, one standard system of die numbers will apply to all sizes of camel back. The dimensions of each size of camel back will be shown by its die number. The first numeral will show the crown width, the second numeral the base width, and the third numeral the gage, as follows:

Die Number	Camel Back Dimensions		
	Crown	Base	Gage
30-40-08 will mean	3″	x 4″	x 8/32″
32-42-09 will mean	3-2/8″	x 4-2/8″	x 9/32″
34-44-10 will mean	3-4/8″	x 4-4/8″	x 10/32″
36-46-11 will mean	3-6/8″	x 4-6/8″	x 11/32″

In selecting the proper die size for a certain matrix it is of first importance to have the crown width of the camel back fit the crown width of the matrix. Under the new program, when a retreader wants to order camel back for a matrix with a 3½-inch crown, he will refer to the die numbers starting with the numeral 34, meaning 3-4/8 inches. If he wants a one-inch wing on each side of the camel back to fill out the sidewall and shoulder design in the matrix, the base of the camel back will have to be 2 inches wider than the crown; consequently the second numeral in the die number should be 54, meaning 5-4/8 inches. If he wants his camel back 12/32-inch thick, then the die number he will order will be 34-54-12. Thus in ordering camel back under the new industry program, each retreader will be writing down the dimensions of the camel back as he writes the die number.

In the case of special dies, where the gage of the camel back is either thicker or thinner at the shoulders than in the center, the die number shows the dimensions as follows:

Die Number	Crown	Base	Center Gage	Shoulder Gage	
42-56-14-15 will mean	4-2/8″	x 5-6/8″	x 14/32″	x 15/32″	(valley die)
42-56-15-14 will mean	4-2/8″	x 5-6/8″	x 15/32″	x 14/32″	(hump die)

In the case of capping stock where the crown width is the same as the base width, or only slightly narrower, the die number is simplified as follows: 60-12 will mean a 6-inch overall width and a 12/32-inch gage; 61-14 will mean a 6⅛-inch overall width and a 14/32-inch gage.

The gage of each size of camel back showing in its die number will be the overall gage including the cushion gum.

Consultants and the Government

Encouragement by the Government of private chemical consultants and laboratories as a measure of national defense is advocated in a report to the Association of Consulting Chemists & Chemical Engineers, 50 E. 41st St., New York, N. Y., by its committee on professional advancement.

"If preparedness for a national emergency is to be effective, the Government ought to be in a position to command the best scientific services which its citizens and its industries can render," it is pointed out. "In order that it may be in such a position, it is desirable that the Government shall cultivate to some reasonable degree all the scientific and engineering agencies of the country so that in time of emergency these may be expanded to meet the needs of the moment.

"It is particularly important to encourage private consultants and laboratories, since their services can be expanded with the least upset to industry. If, when no emergency exists, the Government utilizes to some extent private consulting, research, analysis, and testing services, becomes acquainted with the capabilities of agencies in these fields, and familiarizes them with government requirements, an important step toward effective preparedness will have been taken.

"It is recommended that the Government's scientific agencies should be accorded all necessary facilities and adequate appropriations for the successful conduct of the Government's scientific work; that governmental scientific bureaus and agencies should refrain from rendering commercial services which private agencies are prepared to render to industry and business; and that the Government, as a matter of preparedness, should adopt the plan of supplementing the work of its own scientific bureaus and agencies by using to a reasonable degree for its own work the services of private consultants and private research, analysis, and testing facilities.

"It is also recommended that whether scientific services to the Government be rendered by the Government's own bureaus or agencies or by private agencies, the results should be made public with reasonable promptness and in such specific form that all taxpayers may benefit by them, except where the national defense interest is best served by not publishing."

For the protection of consumers the association, it was also announced, has initiated a program through the American Standards Association in cooperation with the American Home Economics Association, the American Society for Testing Materials, the Consumers' Division of the United States Department of Labor, the National Association of Purchasing Agents, and the National Bureau of Standards to end abuses in connection with certifying the quality of commercial products. A recommended practice by which unbiased opinions can be provided manufacturers, sellers, and consumers will be developed.

Studies of defects in the patent system and of unfair competitive practices have been undertaken by the association together with the classification and registration of types of chemical service.

Dunlop Tire & Rubber Corp., Buffalo, N. Y., has added to its sales organization Walter O. Ring and Herb Andrus, both well known in the athletic goods trade. Mr. Ring, with headquarters at the company's office at 500 Fifth Ave., New York, N. Y., will manage the jobbing business of the firm's golf and tennis lines. He will operate on a national basis and will call on the trade throughout the country. Previously he was with the golf department of the P. Goldsmith Sons, Inc., and prior to that was connected with the L. A. Young Golf Co. Mr. Andrus will cover the Pacific Coast, working out of the Dunlop office at 1547 Mission St., San Francisco, Calif. He will call on jobbers, dealers, and pros and will concentrate chiefly on golf equipment. Mr. Andrus formerly was associated with the Wilson Sporting Goods Co. on the Pacific Coast. Dunlop also announced that its "Gold Cup" and "Maxfli" golf clubs, formerly sold only to pros, are now available to the jobbing trade. Three new golf ball brands have been packaged by Dunlop for the jobbing trade. These include "Maxtuf," "Trubilt," and "Dunlop Blue." In addition the Dunlop "Gold Cup" also will be available to the jobbing trade for 1937.

Dunlop Tire has been awarded a $100,000 contract to supply the State of New York with auto tires in 1937 for state-owned cars. About 20 additional employes will be hired as a result. Company officials stated production has increased 25% in the past year and further gains are expected for this year.

I. B. Kleinert Rubber Co., 485 Fifth Ave., New York, N. Y., according to President Ralph K. Guinzburg, has increased its 1937 advertising budget 25%. Newspapers and magazines will be used.

(*Continued on page 75*)

OHIO

FOR 1937, one analyst reports market conditions governing the prices of both raw materials and finished products indicate a broad rising trend that should enable the rubber manufacturing industry to enjoy further expansion in profits. There are signs, furthermore, that the upward trend in prices over a period of time will be orderly enough to prevent losses that might grow out of runaway markets and make the profits broad enough to compensate in a measure for the fluctuating nature of the industry's earnings. A discouraging note, however, is the constant threat of labor troubles.

Despite the automobile strike the longer range trend in production of tires and tubes appears strongly upward in support of prospects for the continued improvement of earnings in the rubber industry. As tire and tube output has not improved to an extent comparable with recoveries in the automobile industry, rubber consumption and prices, quite a definite expansion in tire production would seem forthcoming to take up this slack. Tire prices are being raised, another favorable sign, and cut-throat competition seems to have been abandoned. Important progress in retail distribution made in 1936 should help the industry in '37. The recovery in tire replacement demand also has been noticeable. One of the brightest aspects in the statistical picture is the sharp reduction in tire inventories. The 1936 figure was the lowest average in 13 years. For inner tubes, too, the monthly average inventory for the first three-quarters of 1936 also was the lowest of the past 13 years. From all angles, it is thus reported, manufacturers of tires and tubes appear in a favorable market. Further gains seem in prospect for both demand and prices so that the value of the business done should rise even more rapidly than physical volume.

The market for mechanicals has expanded remarkably in recent years, and this growth is expected to continue.

Now, however, Nature is taking a hand to spoil the bright outlook. Adverse weather conditions and record floods are doing much to check the advances made by business in Ohio, the Midwest, and some southern states.

The Patterson Foundry & Machine Co., East Liverpool, O., through W. Harlan Henszey, district manager, Widener Bldg., Philadelphia, Pa., has announced the appointment of George L. Anderson, who, becomes connected with that office as sales engineer. Mr. Anderson is a chemical engineer (University of Pennsylvania) and has for twenty years specialized in the design, application, and sales of process equipment in chemical, food, and other industrial plants in the process industries.

Carl Pharis

The Pharis Tire & Rubber Co., Newark, has announced that as a result of a recent shift in ownership and control Carl Pharis, who for more than a quarter of a century has guided the destinies of the company, from its modest beginnings, with a production of 50 tires a day, to its present position, with a production of 6,000 tires per day, 5,000 inner tubes, and 4,000 bicycle tires, has become president, treasurer, and general manager of the company. W. I. O'Bryan, for twelve years Pharis comptroller, becomes also the new secretary of the company; and W. A. Patterson, formerly with Firestone and Goodrich and for the past sixteen years with Pharis, lately as assistant sales manager, has been named sales manager. These two men will be associated with Mr. Pharis on the new board of directors of the company. It is understood that expansion plans are under consideration.

Tire Prices Raised Again

Higher prices for crude rubber have led tire manufacturers to raise prices about 6%. The move was started by the Goodyear Tire & Rubber Co., Akron, January 18, followed by The B. F. Goodrich Co., Firestone Tire & Rubber Co., and The General Tire & Rubber Co., all of Akron; United States Rubber Co., 1790 Broadway, New York, N. Y.; and Lee Tire & Rubber Corp., Conshohocken, Pa. Sears-Roebuck & Co., Chicago, Ill., mail order house in its new spring and summer catalog shows tire prices 5% higher than those in its last catalog. No announcement has been received yet regarding a raise in tire prices at its retail stores.

Goodyear declared its increases applied to all kinds of tires except those for bicycles and toys.

One Goodrich official, commenting upon this horizontal price increase of 6% in automobile tires and tubes stated it is "not even sufficient to compensate for the current increase in the price of crude rubber alone, to say nothing of other increased costs."

The Dayton Rubber Mfg. Co., Dayton, plans to erect a steel frame building to its plant to cost about $50,000.

The Aetna Rubber Co., 815 E. 79th St., Cleveland, has announced the resignation of its president and general manager, Stanley T. Campbell, to become vice president and general manager of The Faultless Rubber Co., Ashland. McConnell Shank has been appointed Aetna vice president and general manager in charge of production and sales; and Tracy J. Calhoun, chairman of the board, is also president. M. C. Teasdale is secretary-treasurer.

The Goodyear Tire & Rubber Co., Akron, through its board of directors extended from January 15, 1937, until the close of business on March 13, 1937, the period within which the company's second preferred stock may be deposited for exchange into the new senior $5 convertible preferred stock and common stock (or negotiable scrip for fractions of common shares) under the plan for rearrangement of capitalization. In the event, however, that a dividend on the second preferred stock is declared payable to holders of record prior to March 13, 1937, the board has determined that the day preceding the dividend record date will be the final one on which shares may be deposited for exchange under the terms of the plan. Notice of the declaration of such a dividend and the resulting termination of the exchange period will be given to all holders of second preferred stock at least ten days in advance of the record date. The exchange period will definitely end on March 13, 1937, unless terminated sooner by declaration of a dividend on the second preferred stock, and the board of directors is without authority to extend it further. The board has also voted a dividend of $4.25 per share on the new $5 convertible preferred stock to be issued on exchanges under the plan that are made after January 15, 1937, and within the extended exchange period. This dividend will be payable on March 25, 1937, to the original holders of record of the new stock issued on such exchanges. To date holders of more than 86% of the second preferred stock have deposited their shares for exchange under the plan's terms.

Goodyear is remodeling with the newest and most efficient machinery the Kelsey Hayes Wheel factory, Jackson, Mich., which it recently purchased. The plant, to be used for tire making, comprises manufacturing buildings, power plant, and 38 acres of ground and should be in operation early this summer.

General Tire News

Many hundreds of distributers, dealers, and salesmen of The General Tire & Rubber Co., Akron, are attending a series of distributer conferences which the company is holding at key points throughout the country. William O'Neil, president, and L. A. McQueen, sales manager, are the principal speakers at the various conferences, held under Mr. McQueen's direction. Company branch managers in the various key cities are cooperating with Mr. McQueen in conducting the conferences. Conference topics will include the company's 1937 advertising, sales, and merchandising programs, talks by company executives and engineers on the product line, including the new Dual 10 flexible tread non-skid tire, the streamline low-pressure Jumbo, and the various types of truck tires adapted for special purposes.

General has just completed a safety motion picture, demonstrating the importance of stopping a car in time in an emergency, and this is being shown to General distributers and salesmen at all of the conferences.

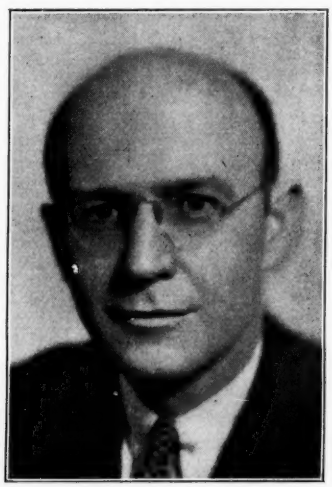
Cities in which the conferences were held during January and February are: Kansas City, Dallas, Memphis, Atlanta, New York, Philadelphia, Boston, Chicago, Seattle, San Francisco, Los Angeles, Denver, and Akron.

Annual Meeting

An increase in sales of $2,407,886, or 15.5% during the past year was reported to General Tire stockholders at their annual meeting in Akron, January 19. President O'Neil stated sales for the fiscal year 1936, which terminated November 30, 1936, amounted to $17,909,886.26 as compared with $15,501,999.70 in 1935. Reported sales do not include sales of General's foreign affiliated companies.

In part, Mr. O'Neil also said:

"While the latest tire price increase of 6%, made this week, was not sufficient to cover the increased cost in crude rubber and, consequently it is likely that there will be additional increases, we are fortunate in being well-covered by forward commitments in rubber at prices substantially under the present market.



L. A. McQueen

"During the year, we purchased at a very favorable figure, a plant in Wabash, Ind. For the past two years, we have been doing a small but successful mechanical goods business and we wanted to take advantage of the increased demand for mechanical goods. We do not contemplate making tires in our Wabash plant. The plant is being equipped rapidly with machinery and we hope to start operations there within the next few weeks. We believe this will be the most up-to-date mechanical goods factory in the United States."

Directors of the company reelected at the annual meeting follow: Mr. O'Neil, W. E. Fouse, C. J. Jahant, G. F. Burkhardt, Charles Herberich, T. F. O'Neil, J. A. Diebold, and J. A. Kraus. Company officers were reelected at the annual meeting of directors, which followed. They are: W. O'Neil, president and general manager; Mr. Fouse, vice president and secretary; Mr. Jahant, vice president; T. Spencer Shore, treasurer; Hayes R. Jenkins, assistant secretary; and T. S. Clark, assistant treasurer.

O'Neil on the 1937 Outlook

Mr. O'Neil recently issued the following statement.

"America is buying better goods. This is true of practically all commodities on the market today. It is one of the most significant developments of 1936 in the business world and it will be increasingly true in 1937. Top-quality merchandise of every kind is coming into its own after a long period in which price alone appeared to be king. In motor-cars, in clothing, in homes, in tires, in fact in all the present-day necessities of living, the trend to better things is the most outstanding development as the new year dawns.

"There is a firmer undertone in the cost of all raw materials. Increased consumption of crude rubber, together with the British-Dutch export restrictions, have combined to bring about steadily-increasing prices of rubber. Lessening of present British-Dutch regulations may be necessary to prevent too rapid an increase in crude rubber prices.

"Many of the present tax laws tend to favor the buyer of top-quality merchandise. Some taxes are just as heavy on the cheaper, poorly-built tires as they are on well-built, high-quality tires because tires carry a manufacturers' excise tax based on the weight of the tire alone.

"Conditions in the rubber industry should be good for at least the next three or four years. It is by no means a declining industry. More material and much larger units are going through America's rubber factories than ever before.

William O'Neil

"As the new year opens, every indication points to a continuance of the improved conditions that exist today throughout our industry."

Goodrich Activities

A complete line of rubber tires for 474 models of 83 different farm implements is announced by The B. F. Goodrich Co., Akron. The new Goodrich farm service implement tires are now available in 22 sizes designed to equip binders, combines, corn pickers and shellers, harvesters, balers, mowers, diggers, planters, spreaders, rakes, threshers, and wagons. This entire line has been engineered to incorporate a new non-directional tread design so that wheels may be interchanged without loss of operating efficiency.

The growing importance of rubber tires for agricultural equipment is evidenced by the increase in the sales of rubber tires for tractors from less than $1,000,000 in 1933 to more than $9,000,000 in 1936, according to W. C. Bray, manager of the Goodrich truck and bus tire department.

Goodrich reports heavy increases in the sale and uses of Nukraft, upholstering material of hair covered with latex and woven into loops forming a structure of figure eights, which is now being employed by manufacturers of truck, bus, automobile, street car, railroad coach, theater and aircraft seats, and for furniture upholstery and mattresses. Eighty-nine leading department and furniture stores in the United States and Canada will shortly display quality furniture equipped with this material used as upholstery fabric or spring decking; and 100 new street cars in Brooklyn, N. Y., 27 in Baltimore, Md., and 50 in Pittsburgh, Pa., are in service with Nukraft as seat upholstery.

Goodrich's Twenty Year Service Club now has more than 1,500 members. The number was boosted past the 1,500 mark in December, when 108 more employes were presented 20-year pins by President J. D. Tew at the semi-annual ceremonial of the club.

In addition to the 108, who had completed their 20 years between last June and the ceremonial date, 35 others in the company's national field organization also had been presented their emblems by company district managers.

Goodrich Company and the associated lines division of the company are releasing four talking slide-film programs produced by AudiVision, Inc., member of the Trade-Ways Group, for showings to the Goodrich dealer organizations.

Personnel Changes

Howard E. Fritz, formerly chemical sales manager of the mechanical division, has been named manager of sales and development for Koroseal, a new synthetic elastic, according to W. S. Richardson, merchandising manager of the Goodrich mechanical division. Dr. Fritz came to Goodrich in 1925 from the faculty of Ohio State University where he received his master's degree in chemistry in 1913, returning to the university after eight years in industry to receive his doctor's degree in 1921. He is succeeded by J. R. Hoover, with Goodrich since 1925 in the laboratories and development departments, who was appointed manager of chemical laboratories in 1930 and became associated with Dr. Fritz in chemical sales in 1931.

George J. Stritch has been named manager of the manufacturers' sales division office in Detroit, it was announced by T. A. Aspell, general sales manager, original equipment tire division. Mr. Stritch has been with Goodrich in Detroit for the last 16 years, and served in the Akron organization three years before going to Detroit.

Several changes in the executive personnel of the automotive accessories department were announced by C. B. O'Connor, general tire sales manager.

B. W. Huling became assistant manager of the department in charge of accessories; E. R. Bell, assistant manager in charge of miscellaneous merchandise; while T. H. Clarke continues as assistant manager in charge of batteries.

F. E. Stephan, M. B. Wilcox, and Clyde Withers were appointed special department representatives. Mr. Stephan will handle the St. Louis, Kansas City, Dallas, Houston, and New Orleans districts; Mr. Wilcox the Buffalo, Pittsburgh, Cleveland, and Detroit districts; and Mr. Withers the Washington, Charlotte, Atlanta, and Cincinnati districts.

P. V. McLaughlin has been assigned to special duties with the department, with Akron headquarters.

Charles L. Campbell was appointed Philadelphia district manager, succeeding G. W. Sawin. Mr. Campbell joined Goodrich in 1912, was later Seattle branch and district manager, Kansas City branch manager, manager of Goodrich associated tire lines sales, and since 1933 manager at Charlotte, N. C.

He was succeeded at Charlotte by R. E. Noble, who came to Goodrich in 1929 as a salesman. Previous to his present appointment he was manager of the Charlotte unit of Goodrich Silvertown Stores from 1930 to 1936 and sales supervisor of the Charlotte district for the last year.

George W. Sawin, formerly Philadelphia district manager, has been named vice president and general manager of The B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., by the board of directors of that company, according to Goodrich President Tew. This appointment fills the position left vacant by the recent death of Frank G. Morley. Mr. Sawin has a record of 24 years' service with Goodrich, having joined the company immediately after graduating in engineering from the University of Delaware in 1912. During the past 15 years he has served Goodrich as manager of the automobile tire department in Akron, district manager in New York, branch manager in Chicago, and eastern district manager in 1929.

Water Inflated Tires

Pneumatic tires for farm tractors are now being partially filled with water to improve traction. After several years of experiment with tires on farm tractors and other farm implements one of the greatest problems was to keep the tires from bouncing around, thus losing their traction, while pulling heavy equipment over uneven ground. Metal weights were in many cases attached to the wheels to weight them down, but these were an additional expense. Putting them on and taking them off also was a constant inconvenience. So the Goodrich engineers, after more than a year's experiments, now recommend the use of water in farm tractor tires.

Use of water provides normal cushioning without rebound or bouncing of the tractors or other equipment. They give the tractor greater tractive ability and better riding qualities. To facilitate putting the water into the tires, Goodrich engineers have developed a simple, inexpensive "adapter," one end of which is fitted to a garden hose and the other to the tire valve. Ordinary city water pressures of from 30 to 60 pounds are usually adequate to fill the tires. Filling may also be accomplished from a tub or barrel by gravity flow, or by an inexpensive pressure tank de-

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Technical Engineer

H. W. Delzell, manager of technical service, tire division, The B. F. Goodrich Co., Akron, has been with the company since 1917, when he began working as a compounder on pneumatic and solid tires and mechanical goods including druggists' sundries. He won his present position in 1931.

Mr. Delzell was born in Cadillac, Mich., in 1888. He is an alumnus of Michigan State College, from which he was graduated in 1913 with a B.S. degree after having majored in engineering.

He belongs to the American Society of Agricultural Engineers, of which he was chairman of the wheel equipment committee, 1933-1935.

H. W. Delzell

Firestone Technician

Leslie Vail Cooper, sergeant at arms of the Rubber Division, American Chemical Society, has been with the Firestone Tire & Rubber Co., Akron, since October, 1922, when he signed up as a research compounder. In 1931, however, Mr. Cooper was put in charge of physical testing and Plant I mill room control, the position he now holds.

He was born on October 22, 1900, at Greensburg, O., and later attended the University of Akron, from which he was graduated in 1920 with a B.S. degree. Mr. Cooper has also written several papers of interest to the rubber industry.

He lives at 876 Oakland Ave., Akron.

Leslie V. Cooper

NEW ENGLAND

BUSINESS activity in New England is at the highest level since 1929. All the major industries have participated in the upturn; employment has been substantially increased, and relief burdens have been reduced.

Rubber concerns in Bristol, R. I., are among the manufacturing establishments whose increased industrial activity during 1936 causes them to have an optimistic outlook.

The Alfred Hale Rubber Co., North Quincy, Mass., recently celebrated the hundredth anniversary of the establishment of the company by Alfred Hale, who started the manufacture of rubber goods in a small way in the kitchen of his home in 1837, with his wife as chief assistant. The original Hale products were diving dresses or suits, and because Hale had a monopoly in their manufacture at the outset, sales mounted steadily. Later the diving suits were supplemented with pumps, hose, and helmets, also of Hale design and manufacture, and sales continued to gain. As the company grew and progressed, it engaged in the manufacture of practically all types of rubber articles, and in 1900 the Hale family sold out the company to W. F. Johnson, E. F. Bragg, and Winslow Blanchard, who incorporated it. In 1916 control of the corporation was purchased by David A. Cutler. Associated with Mr. Cutler at the present time are his sons, A. Cushing Cutler and David Roy Cutler. The former is in charge of the Hale plant, and the latter now engaged in the development of the Kaysam method of making rubber moldings and castings. The Alfred Hale Rubber Co. thus enters its second century of business fully alive to and active in the further progress of the rubber industry.

Philip Schidrowitz, eminent British rubber technologist, is visiting this country on business. He is staying at the Parker House, Boston, Mass.

Carr Mfg. Co., manufacturer of rubber thread, Bristol, R. I., through President Arthur Carr reflects the prevailing optimistic spirit in New England regarding the future. Mr. Carr reported a very substantial improvement for 1936 over business during 1935, pointing out that the number of employes increased from 90 to 135.

Davol Rubber Co.'s Foremen's Club, Providence, R. I., recently held an annual dinner party at the Narragansett Hotel. Among the guests were Ernest I. Kilcup, executive manager of the company; and Walter L. Davol, assistant manager. Joseph L. Harris was chairman of the general committee and assisting him were Richard N. Carr, newly elected president of the club; Frank J. Jackson, retiring president; and John A. Kelly.

Alfred B. Lingley

Factory Manager

Alfred Beverly Lingley, factory manager, was born in McAdam Junction, New Brunswick, Canada, but spent most of his boyhood in Portland, Me. He is an alumnus of the University of Maine, Class of 1920, with B.S. degree in chemical engineering also in 1923. His work in the rubber industry began as foreman with the Converse Rubber Co., Malden, Mass. (1920-25). Immediately following this experience he became plant superintendent of Phillips-Baker Rubber Co., Providence, R. I. (1925-29), advancing in 1929 to factory manager of the same concern, which position he now holds.

He is a member of Sigma Chi and is also a Mason and Shriner, a member of the Rhode Island Rubber Club, serving on its executive board. His hobbies are dahlias and saddle horses.

His address is 44 Warren St., Providence, R. I.

Kennecott Wire & Cable Co., on Bourne Ave., East Providence, R. I., is adding new fireproof roofs to its buildings.

Washburn Wire Co., Bourne Ave., East Providence, R. I., will erect a railroad trestle at its plant.

The Gates Rubber Co., Denver, Colo., has leased additional space on the sixth floor of the United Drug Co. Bldg., 716-740 Columbus Ave., Boston, Mass.

East Providence, R. I., Fire Department divided its contract for 4,000 feet of fire hose ordered by the Town Council among four concerns: The B. F. Goodrich Co. and the Fabric Fire Hose Co., each 1,500 feet; and the American La France Co. and American Fire Equipment Co., each 500 feet.

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NEW JERSEY

THE strike in the automobile industry has little effect upon the rubber industry in New Jersey. Manufacturers for some time have been discussing the possibility of an advance in prices of goods, but very few of them have taken the initiative. All, though, may do so shortly.

The Thermoid Co., Trenton, has appointed Samuel K. Dennis, of Dallas, Tex., director of replacement sales, automotive division. He was formerly sales supervisor and sales manager of the southwestern territory for the company, with which he has been affiliated for more than thirteen years. He will make his home in Trenton.

Lawrence M. Oakley, sales manager, Essex Rubber Co., Trenton, who recently returned from a business trip through New England, reports satisfactory conditions there.

Israel Citron, president of the Murray Rubber Realty Holding Co., Trenton, has purchased the former automobile tire manufacturing plant of the Murray company. He will improve one of the larger buildings in the group for industrial purposes. He purchased the plant from a group of New York men at a sale in Federal Court. The City of Trenton has a claim on the plant for nearly $50,000 in delinquent taxes.

Jos. Stokes Rubber Co., Trenton, is planning new additions and other improvements to its plant. The company is still functioning to capacity.

Puritan Rubber Co., Trenton, continues to operate with two shifts, with good prospects ahead.

Martin Rubber Co., Inc., formerly in Long Island City, N. Y., according to President Walter L. Tepper, has completed its press department, which is now in operation at the firm's Long Branch, N. J., plant. The company is now in a position to handle much of the soft rubber molded goods business it was unable to handle heretofore.

Luzerne Rubber Co., Trenton, reports a better demand for hard rubber goods of all kinds.

Pierce-Roberts Rubber Co., Trenton, has placed extra hands at work and continues to run 24 hours a day.

Trenton Tire Dealers' Association had a prosperous year in 1936, with a larger demand for tires and tubes during the last six months. The association increased prices November 1.

Charles E. Stokes, Jr., vice president of the Home Rubber Co., Trenton, and Mrs. Stokes have sailed on a South American cruise. They will be absent some time.

Pocono Rubber Co., Trenton, continues to operate at capacity, with increased orders for rubber tiling.

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FINANCIAL

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges. Most of the figures are subject to year-end adjustments.

Dayton Rubber Mfg. Co., Dayton, O., and subsidiaries. Year to October 31: net income, $510,465, after taxes and other charges, equal after dividend requirements on 46,518 shares of $2 cumulative Class A stock, on which are arrears, to $2.46 a share on 169,691 no-par common shares. This compared with $49,565, or $1.06 a Class A share, in the preceding year. Stockholders on February 1 will be asked to cancel 53,482 shares of unissued Class A stock.

The General Tire & Rubber Co., Akron, O., and subsidiaries. Fiscal year ended November 30, net profit of $1,291,011 after depreciation, federal income taxes, loss of $16,862 on sale of capital assets and other charges. After dividend requirements on the 6% preferred stock, on which is an accumulation of unpaid dividends, the profit is equal to $2.53 each on 443,100 shares of $5-par common stock. In the preceding twelve months the company had a net loss of $115,756.

Sales in the last fiscal year, not including those of foreign affiliated companies, amounted to $17,909,886, against $15,501,999 in 1935.

Current assets on November 30 last amounted to $8,583,480, and current liabilities $2,367,471, compared with $7,447,185 and $1,905,713 respectively a year before. The company has no bonds or funded debt. Last year it retired $88,400 of preferred stock by purchases for the sinking fund so that outstanding preferred stock has been reduced to $2,799,200.

Lee Rubber & Tire Corp., Conshohocken, Pa., reports the best earnings for any year since 1927, and the largest volume of sales since 1928. Net profit for the fiscal year ended October 31, 1936, amounted to $563,825 after depreciation and all charges, equal to $2.19 each on 256,465 outstanding capital shares. In the preceding year the net profit was $184,586, or 73¢ each on 254,465 shares then outstanding. Net sales for the year totaling $10,599,693 increased 25% over the previous year when sales were $8,451,448.

Dominion Rubber Co., Montreal, P. Q., Canada, controlled by the United States Rubber Co., 1790 Broadway, New York, N. Y., has decided to postpone redemption of its outstanding 6% gold bonds due October 1, 1946. Reason is recent judgment of the English courts respecting a corporation's liability in connection with the gold clause in bonds, and it was decided to await the decision of higher courts. The company, however, will purchase any of its 6% gold bonds offered between February 1, 1937, and April 1, 1937, and pay Canadian dollar value plus premium of 10% and accrued interest to April 1, 1937.

Hewitt Rubber Corp., 240 Kensington Ave., Buffalo, N. Y., manufacturer of mechanical rubber goods, plans to retire its outstanding bonds and debentures and make a public offering of its common stock.

Knickerbocker Rubber Co., 210 N. Clinton St., Chicago, Ill., recently increased its corporate stock from 200 shares par value to 900 shares non par value.

New Incorporations

Allen Rubber Co., Inc., New York. Capital 200 shares, no par value. A. M. Levien, 217 Broadway. Rubber products.

Electric Wire & Assembling Corp., Pawtucket, R. I. Capital 500 shares of common stock, no par value. A. J. Dunn, M. R. Russell, and J. H. Smith, all of Providence. Manufacture electric wires and appliances.

Fremont Rubber Products Co., Columbus, Ohio. R. D. Hetrich, McK. Howard, and R. B. Lucas, of Fremont, Ohio.

Lastic-Craft, Inc., New York. Capital 100 shares, no par value. B. Robbins, 25 Warren St., New York, N. Y. Rubber goods.

Premier Latex Co., Inc., New York. Capital 200 shares, no par value. P. Kedner, 270 Broadway. Rubber products, foundation garments.

Schiabo Corp., Jersey City, N. J. Capital $180,000. L. Schiavone, and R. V. and M. V. Bonome, all of Glen Ridge, N. J. To deal in scrap rubber and metals.

Dividends Declared

Company	Stock	Rates	Payable	Stock of Record
American Wringer Co.	5% 10-Year Notes	$1.00	Dec. 15	Dec. 7
Dayton Rubber Mfg. Co.	Class "A"	$1.00 accum.	Jan. 14	Dec. 29
Goodyear Tire & Rubber Co.	$5 Conv. Pfd.	$4.25	Mar. 25	Jan. 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	$2.50, extra	Jan. 15	Jan. 9
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	$0.63 q.	Jan. 15	Jan. 9
Lee Rubber & Tire Corp.	Com.	$0.25	Feb. 1	Jan. 15
Thermoid Co.	Two shares of common stock on each share of new	$3 conv. pfd.	Feb. 10	Feb. 3
S. S. White Dental Mfg. Co.	Com.	$0.30 q.	Feb. 1	Jan. 19

MIDWEST

THE automobile strike is the dominating influence right now on Midwest business conditions. Its bad effect, moreover, is spreading with troublesome results. These labor controversies have a special significance for business because they are a struggle for power rather than a series of disputes about grievances. At present it seems hardly likely that the labor conflicts in progress will be carried through to conclusions in the old-fashioned way. The reason for this thought is that settlements of industrial disputes seem neither conclusive nor lasting where sit-down strikes become the habit of workers. They are so easy to institute, so effective, and require so little cooperation that unions and labor leaders seem as little able to control them as are employers.

Van Cleef Bros., Chicago, Ill., manufacturer of Dutch Brand rubber and chemical products, held its annual sales conference in Chicago concurrently with the Automotive Service Industries Show. All members of the sales and sales administration division of the organization were present. New products and policies for 1937 were fully discussed. Improvements in old products were suggested, which will be made promptly. One of the important functions of the conference is the awarding of prizes to the winners in the firm's annual sales contest for its own representatives. Many of the men broke records of long standing for sales, in this contest and earned handsome rewards. The sales staff also made a tour of the firm's plant, including the new addition of 20,000 square feet now nearing completion. The firm and its salesmen were unanimous in the opinion that 1937 will be an outstanding year in the history of Van Cleef Bros., exceeding 1936, which proved one of the very best in the annals of the organization.

Pacific Rubber & Tire Mfg. Co., Fiftieth Ave. and E. 12th St., Oakland, Calif., closed for more than two weeks because of a strike, recently resumed operations, following a compromise agreement between company and workers. The plant employs more than 150 men, who were affected by demands of the United Rubber Workers' Union, and about 50 other miscellaneous employes. The union asked recognition and pay raises in the lower brackets. The agreement does not provide for recognition of the union or the closed shop, but permits any worker to join a union of his own choosing, and no discrimination for union activities is promised. It also provides for increases averaging 7½%, and ranging as high as 40% in the lower brackets.

Rubber Industry in Europe

GREAT BRITAIN

Rubber in Chewing Gum

The use of rubber and latex in chewing gum is discussed by Harry Barron in a recent issue of the London *Rubber Age*. According to the author, Dunham (U.S.P. 1,534,929, 1924) was probably the first to use rubber as the basis of chewing gum. He mixed it with heated hydrogenated oils and waxes and purified the products by treatment with sodium hydroxide. The products had, however, among other defects, a burnt, rubber taste, attributed to the use of too high a temperature. Triggs (B.P. 378,073, 1930) claimed that by operating at temperatures not exceeding 120° C. this defect could be prevented. He suggested the following mix: rubber, 100 parts; hydrogenated cottonseed oil (m.p. 52 to 70° C.), 100 parts; coumarone resin, 150 parts; hydrogenated peanut oil, 50 to 250 parts.

Canning (B.P. 347,376, 1930) used diluted latex with powdered coumarone resin, powdered hydrogenated vegetable oil and cocoa powder, afterward improving his method by creaming the latex and removing nitrogenous matter first. Zimmerli (U.S.P. 1,829,029, 1931) used concentrated latex, and Reed (U.S.P. 1,989,246, 1935) suggested masticated crepe rubber added to polyvinyl chloride on a mixing mill.

It is worth noting that chewing and even swallowing rubber does not appear to produce any harmful effects.

Mr. Barron concludes his article by pointing out that rubber is definitely being employed in the production of chewing gum base in quantities which seem surprising when the average price of the chewing gum is considered. Greatest activity is taking place in the United States; while Germany makes fairly large quantities for export. As the writer remarks, rubber seems to be so fundamentally a material for utility purposes that uses like the above are almost incredible, and it is remarkable that those factors which are important in cable manufacture, e.g., deproteinization, are equally important in this far-removed application.

Over-Production in Tires

The tire market in England is suffering severely from over-production, said Sir Walrond Sinclair, chairman of the British Tire & Rubber Co., Ltd., at the company's annual meeting. This was due, first, to the growth of nationalism causing the world tire production capacity to increase from year to year; at the same time, technical development in this branch of the industry had been extremely rapid, and every year the life of tires is substantially lengthened. Consequently, although more and more cars are being put on the roads, actual tire consumption is decreasing, and in the last decade seems to have gone down from about five per car to well under two. It is obvious that for many years to come consumption would remain below full world production capacity, and as long as manufacturers continue to strive for 100% output, so long would it be impossible to obtain a fair and remunerative return. For some years the British Tire company has vainly advocated voluntary limitation of output by the tire industry. As far as the firm itself is concerned, the necessity of adjusting tire production to meet the situation was taken into consideration when about three years ago it decided to widen the range of manufacture of other rubber products. As a result, the company is now in the fortunate position of being able to face the current situation with equanimity.

On the subject of rising prices for crude rubber the chairman declared that so far this had not proved a serious handicap to progress since the upward movement was regulated in a gradual and orderly manner, and he hoped those responsible for the control of crude rubber would continue successful in their aim to prevent undue fluctuations and speculation.

The concern booked net profits of £148,322 against £132,106, which with the carry-forward made £183,908 available for distribution and appropriation against £164,668. The total distribution on the ordinary capital, now £900,000 instead of £800,000, came to 10% against 9½%.

Notes

The annual general meeting of the London and District Section of the Institution of the Rubber Industry was held on December 14, 1936, when the following were elected to the committee of the section: C. H. Birkitt, J. H. Blake, R. F. J. Colsell, F. H. Cotton, W. S. Davey, B. L. Davies, T. R. Dawson, H. A. Daynes, J. N. Dean, J. P. Griffiths, M. M. Heywood, E. P. Kay, W. J. Perry, H. Standring, S. D. Sutton, and W. W. Watkins. Later Dr. S. S. Pickles presided at the meeting at which a paper on "Industrial Research, with Special Reference to the Rubber Industry" was read by F. G. W. King in behalf of the author, A. Healey, works director, Dunlop Rubber Co., Ltd., who was unable to attend.

W. F. V. Cox, I. R. I. secretary, extends a cordial invitation to those rubber men who will be in England for the coronation to use the Institution's offices for their convenience. As these quarters are strategically located, Mr. Cox suggests visitors have their mail addressed there in his care, and he offers his services and advice and those of his staff to visiting rubber people.

The use of rubber is recommended not only for horseshoes, but for various less well-known protective contrivances for horses, as knee caps with sponge rubber or other rubber pads, for use in slippery conditions; different types of boots with rubber padding to protect other parts of the legs prone to injuries, and also rubber boots for treating the fault in horses known as over-reaching.

India Rubber Gutta-Percha & Telegraph Works, Ltd., reports that business showed a further improvement during the past year, when net profits came to £66,137 against £51,186. With the carry-forward from last year the balance available for distribution was £75,876 against £58,489. The company paid a total of 8% on the preferred ordinary shares and altogether 9% on the ordinary shares. It should be pointed out that all the ordinary shares and nearly 95% of the preferred capital are held by the British Tire & Rubber Co., Ltd. Rebuilding and re-equipment at the Silvertown works are proceeding smoothly, and satisfactory progress is also being made on improving the factory at Buenos Aires, which continues to operate profitably although competition from the local factories is becoming ever keener. The outlook for trade in England is considered favorable.

Under special arrangements with Imperial Chemical Industries, Ltd., Monastral Fast Blue BS., the fast blue copper phthalocyanine pigment put on the market last year by this firm, is now being made in Germany by the I. G. Farbenfabriken, A.G., and in America, by the Dyestuffs Division of E. I. du Pont de Nemours & Co., Inc. The pigment will also be sold under the name Monastral Fast Blue BS. in the United States.

RUSSIA

During the first nine months of 1936, Soviet Russia imported 23,008 tons of crude rubber, value 44,022,000 rubles, and exported 174 tons of rubber manufactures, value 587,000 rubles.

HOLLAND

The International Association for the Rubber Growers in Netherland India announced in its report for 1935 the reorganization of its Technical Division. Since funds for research and propaganda are collected from all producers of rubber in Netherland India, it has been found desirable to form a new organization to take over the work of the Technical Division, under the direction of a board of eight members, four of whom are appointed by the Netherland India Government and four by the International Association. Accordingly on October 31, 1936, a new Rubber Institute was established in Amsterdam. For the time being research will be conducted in a temporary building in the botanical garden of the laboratorium for Technical Botany, of the Technical Institute, Delft. The formation of the new organization is in line with the provisions for research and propaganda of the International Rubber Regulation Agreement. To provide funds for this research work and propaganda a uniform duty is levied on net exports from the rubber producing centers concerned. The money is divided, as far as research is concerned, among the research organizations of Great Britain, Netherlands, and France in proportion to the standard quota.

As soon as the three national organizations have been established, an International Research Board will be created to coordinate the work.

The present report of the Technical Division of the International Association covers the work up to September 30, 1936. Research in road surfacing with a mixture of rubber and asphalt continues, and tests have been made in the provinces of Gelderland and North Brabant, with surfaces of powdered rubber, asphalt, and filler, which so far seem to be giving favorable results. Interest in powdered rubber is as great as ever. With the aid of a chemist from the National Rubber Bureau the defects attaching to one type of powdered rubber have to a large extent been removed. A successful laboratory demonstration of the production of construction sheets of latex and wood fibers was held. Tests are still progressing to protect cheese and bananas with latex films, to impregnate cotton with latex, and to combine latex with asbestos for packing.

J. G. Fol, director of the Technical Division, has been nominated to the Committee for Standardization of Rubber Goods, recently formed by the General Committee for Standardization in Netherlands.

GERMANY

In view of the many regulations to restrict the use of crude rubber that the German government has issued from time to time, it is interesting to note that crude rubber imports continue to rise steadily. During the first ten months of 1936 these imports totaled 592,134 quintals, against 537,663 in the corresponding period of 1935. Reexports were only 4,501 quintals, against 11,171 quintals, so that the net amount retained in the country was 587,633 against 526,492 quintals. Imports of manufactured goods again declined, 17,500 quintals, value 3,439,000 marks, against 47,963 quintals, value 3,512,000 marks. The considerable difference in the quantity of imports is accounted for by the sharp drop in the purchases of foreign used tires.

Rubber goods exports rising steadily, came to 136,230 quintals, value 33,628,000 marks, against 116,970 quintals, value 33,083,000 marks. This included 221,155 against 156,631 automobile tires; 116,904 against 91,338 automobile tubes; 816,562 against 778,573 bicycle tires; 732,985 against 669,155 bicycle tubes; and 2,656 against 3,503 solid tires.

During 1937 nine large exhibitions will be held in Berlin. From January 29 to February 7, 1937, the agricultural show Green Week is to take place, to be followed by the International Automobile and Motorcycle Show, for which no definite date has yet been set. The Aquatic Sports Exhibition is scheduled for May 20 to 29, and the first National Exhibition of the German Textile and Garment Industry will take place March 25 to April 4. A propaganda and educational exhibition, "Give Me Four Years' Time," is set for May 5 to June 20, and there will be displayed numerous photographs, pictures, and much printed matter to demonstrate German achievements under Hitler's leadership. The Great German Radio Exposition takes place July 30 to August 8; the International Dairy Exhibition will be held August 21 to 29 in connection with the International Dairy Congress and will be followed by the Annual Show for the Hotel and Restaurant Industry and the Provisions Trade, September 24 to October 5. Finally there will be the International Hunters' Exhibition from November 2 to 21.

How many rubber articles does a German rubber goods factory produce, asks the *Gummi-Zeitung,* and answers its own question with the statement that one of the biggest German rubber works makes about 30,000 different articles, classed according to type, finish, and size. These include under the head technical goods, 10,000 items; accessories for vehicles, 8,000 items; surgical goods, 6,000 items; apparel, 3,000 items; tires, 2,000 items; toys and sporting goods, 1,000 items.

EUROPEAN NOTES

The Honefoss Gummi-Industrie A.S., Honefoss, Norway, was recently established with a capital of 500,000 kroner to manufacture rubber footwear.

Finland imported 2,311 tons of crude rubber during 1935, against 1,830 tons in 1934; also 33 tons of belting, against 31 tons; 153 tons of packing, against 107 tons; 22 tons of hose, against 18 tons. Automobile tire imports fell from 722 to 595 tons, and cycle tires from 155 to 114 tons; while footwear imports remained stationary at 50 tons. The exports included besides 106 tons of unspecified rubber goods, 157 tons of footwear and 10 tons of belting. In the first half of 1936 crude rubber imports declined from 1,059 tons in the same period of 1935 to 648 tons.

CANADA

The fixed values for duty established April 22, 1933, on rubber-coated fabrics and pyroxylin-coated fabrics and papers from the United States were canceled by the Canadian Department of National Revenue, effective November 3, 1936, according to Assistant Commercial Attache Oliver B. North, Ottawa. The canceled fixed values were based on the cost of manufacture plus a reasonable advance for selling cost and profit. From November 4, 1936, the values for duty must not be less than the values as sold for home consumption in the principal markets at the time of export to Canada, nor less than production costs plus a reasonable advance.

According to a later report from the same source, the Canadian Tariff Board issued rulings on December 2, 1936, classifying rubber tires, bona fide cataloged and sold only for tractors, under item 409m, free of duty from all sources.

NEW ENGLAND

(*Continued from page* 65)

Bolta Rubber Co., Lawrence, Mass., manufacturer of combs and hard rubber products, has purchased a three-story building of approximately 35,000 square feet floor space. Increased business necessitates the additional facilities.

Armstrong Rubber Co., 475 Elm St., West Haven, Conn., will build a storehouse addition to its plant at a cost of $28,000. The structure will be of reenforced concrete and brick, two and one-half stories, 80 by 100 feet.

Davol Rubber Co., Providence, R. I., has been elected a member of the Association of National Advertisers, Inc. A. B. Pearson will act as company representative in this association.

Everlastic Inc., narrow fabric manufacturer, Chelsea, Mass., sold its Pawtucket, R. I., property to The Standard Mill Supply Co., Providence, R. I. This property, located between Main and Trenton Sts., and West Ave. will be used by the purchaser in connection with its business within the next few months, giving employment to about thirty persons.

Rubber Industry in Far East

NETHERLAND INDIA

Native Rubber Growers

The government issued an order, effective January 1, for individual restriction for native rubber in those districts in the Outer Provinces where the special export duty was in force.

For some time past the Central Bureau has been making out export licenses for the native rubber growers, said to number about 750,000. For the first quarter of 1937 these are to be issued separately for each month, so about 2,250,000 licenses must be prepared.

The work of arranging and analyzing the great mass of statistical data collected in connection with native rubber is far from complete, and authorities are not yet prepared to give definite figures regarding the total productive capacity of all the native gardens. But this much is clear already, that even a very rough estimate of total output must be considerably above the 350,000 tons which a London telegram mentioned in connection with the suggestion that the ruling prohibiting new planting should now be rescinded.

During 1937 native growers will be permitted to export approximately 170,000 tons of rubber. Licenses may be sold, but may only be used for exporting native rubber from the same province for which it was originally issued, the intention being to prevent too great a shift of production to the cheapest producing centers. If this permission to transfer licenses is unduly abused, appropriate measures to curb the evil will be taken.

Of the total exportable amount of native rubber, Borneo's share will be by far the greatest, over 40%, or 19.39% for South East Borneo and 21.09% for West Borneo. Then follow Djambi with 15.59%, Palembang 14.19%, East Coast Sumatra 12.27%, Riouw and dependencies 8.59%, Tapanoeli, 3.92%, West Coast Sumatra, 2.89%, Banka 1.46%, and Atjeh 0.61%.

Brown Bast

The Malang planters recently held a very well-attended meeting when Dr. A. Pfaltzer, of the Malang Experiment Station, spoke on brown bast. Although this disease, first definitely recognized in 1917, has been widely studied, there is still a difference of opinion as to its real nature and consequently as to the best method of treating it. There are, roughly speaking, two theories concerning it; one school believes brown bast is a reaction disease and thus even a symptom of recovery; while the other regards it as indicating degeneration. The method of treatment is, of course, influenced by these divergent views.

Hitherto the experiment stations had always advised treating the wounded area, if large, by scraping and covering the wound and, where necessary, resting the affected trees completely; the treatment for smaller wounds consisted in isolating the area by appropriate cuts and continuing to tap, but, according to a milder system, usually using a shorter tapping cut. Experiments in Sumatra, however, have shown that locally neither treatment of the wound nor rest periods are needed and that nothing more is required than a shorter tapping cut.

What Is a Clone?

Next Dr. J. Gandrup, director of the Malang Experiment Station, discussed the question "What is a Clone?" It appears that there is still much confusion among some planters as to what really constitutes a clone. Dr. Gandrup explained that there are two distinct methods of plant reproduction: the sexual and generative system by means of seeds; and the asexual or vegetative system by means of other parts of the plant. In the first, new individuals arise as a result of a fertilizing process in which there is coalescence of a male cell and a female cell, which may come from two different plants or from the same plant. In vegetative propagation the starting point is a single individual; the plants are reproduced from this individual by vegetative means as grafts, buddings, cuttings, etc., and have exactly the same characteristics as the original individual. All plants which are thus developed from a single plant are called a clone. Plants which develop from the seeds of a single tree or of a single clone are called a family. If buddings are taken from a single clone and grafted on to members of a single family, the result is again a clone; but this is not the case if parts from different members of a seedling family are grafted on to stems belonging to a single family. Seedlings are distinct individuals with distinct characteristics, even when they belong to the same family; whereas the members of a clone all have the characteristics of the original individual from which they were developed.

Notes

For the first quarter of 1937 the exportable allowance for estate rubber is 51,873,750 pounds.

The directors of the Netherlands India Customs Union are said to be seeking support in Holland for a movement to have the extra rubber export duty raised from 2% to 4% to enable the government to give government clerks an increase in salaries.

Final figures for rubber exports from Netherland India in October, 1936, total 29,261,725 kilos, dry weight. Of this, estate rubber from Java and Madura accounted for 6,591,310 kilos, including 10,372 kilos latex; while estate shipments from the Outer Provinces came to 10,476,259 kilos, including 945,669 kilos latex. Native rubber exports were 12,170,522 kilos. At the same time Java and Madura shipped 23,634 kilos of tires.

Latex exports continue to increase and over the first nine months of 1936 were 2,564 tons above those for the corresponding period of 1935, that is 7,869 against 5,305 tons. Indeed the 1936 figures to the end of September exceeded the total for the whole of 1935, 7,664 tons.

JAPAN

The Imperial Invention Association, Tokyo, recently decided to award a prize of 10,000 yen to the inventor of a synthetic rubber. The main conditions are that such a product should contain no natural rubber and that the raw material required for its manufacture should be available within the country. Several firms claim to have developed synthetic rubbers of late, but apparently these are not considered eligible for the above prize.

Our January issue mentions research work on synthetic rubber in Japan. Further details published by "Contemporary Opinions on Current Topics—Japan Trade and Engineering Supplement," Tokyo, state that the product put out by the Sumitomo Electric Wire Works is known as "Glyside." The Hodagaya Soda Co. has developed a chlorinated rubber sold under the name "Aizen." The Furukawa Electric Co. has developed the artificial rubber "Thionites," described as a polymerized ethylene tetrasulphide of the formula $(CH_2CH_2S_4)N$; it is a reaction product of ethylene-di-glycolide and sodium tetrasulphide. The present improved quality is said to be comparable to American and German artificial rubbers. Curing is effected by adding zinc white and heating. As the tensile strength of this product is lower than that of natural rubber, it cannot be used where high strength is required.

MALAYA

Production Figures

Quarterly figures of rubber production on small holdings of under 100 acres show output slowly increasing in the second quarter of 1936 and much more rapidly in the third quarter. Nevertheless the total for the first nine months of 1936 fell below that for the same period of 1935, the comparative amounts having been 95,026 and 106,479 tons.

Although there has been more tapping, data for the acreage of mature rubber out of tapping show much untapped rubber in certain sections, and here and there even an increase. In Negri Sembilan, for instance, 57,777 acres out of a total tappable area of 86,274 acres or 67% was untapped; at the end of June, 1936, the untapped area had been 57%. To offset this, the untapped area in Singapore was only 3%. The total area out of tapping at the end of September, 1936, was 356,820 acres, or 32.8%.

Estates of over 100 acres produced 170,133 tons during the first nine months of 1936, and their total area out of tapping at the end of September was 25.8%, or 474,865 acres out of a total of tappable area of 1,840,646 acres.

New Sheeting Battery

The thirteenth annual exhibition of the Malayan Agri-Horticultural Association was held in Kuala Lumpur in August, 1936. This is primarily an agricultural show, but a variety of manufactures, including different kinds of rubber goods, mostly Dunlop products, was also displayed.

Of special interest to rubber growers was the rubber machinery exhibited by different Singapore engineering companies, and more particularly two new types of automatic sheeting batteries shown by Guthrie & Co., Ltd. The machines, designated as type R and G respectively, are smaller and larger units built on the same principles. The first is designed to handle smaller crops and the second is for use on larger estates. Both are compact, neat, and clean in appearance and evidently easy to maintain in that condition. The smaller machine really consists of two separate units, each with three pairs of rollers, 24 inches long and 6 inches wide. The maximum amount of coagulum it can handle in an hour is 1,800 pounds, depending on the kind of coagulum. Only four operators are required for one machine: one to convey the coagulum to the machine, two to attend the machine itself, and another to take up the coagulum after it has been rolled out and cut it in two lengths ready to be taken to the smoke house. This is an improvement on the continuous or line-ahead sheeting batteries, hitherto considered the most up-to-date, and there is, of course, no comparison with the older, non-continuous sheeting machines, still in use on many estates, which require eight workers. Because of the efficiency of the machine and the practically foolproof construction, no specially skilled labor is required, which again makes for a saving in labor costs. But not only is this machine labor-saving and efficient in working, it is also economic to run; actually it requires less than 3 h.p., but 5 h.p. is usually recommended.

The larger machine has rollers 30 by 7 inches arranged so that the coagulum passes through the machine without being handled. Outputs of over 2,000 pounds of sheet 19 inches wide have been obtained per hour, with only three operators working on the machine.

It may here be mentioned that even before the introduction of this new machine, Malaya was ahead of Netherland India in the matter of economic sheet production. Dutch visitors have been struck by local methods and have had to admit that here sheet is produced much more cheaply and efficiently than in their own districts. In some cases they have not been slow to adopt Malayan methods on their return to their own plantations and have thus been able to effect considerable savings in the cost of making sheet. The economy, as far as the Dutch are concerned, seems to be chiefly a matter of saving on cost of labor.

This latest machine, the invention of a local planter, now affords the opportunity of still greater reduction in the costs of sheet manufacture.

INDO-CHINA

In September, 1936, Indo-China exported 3,560,827 kilos of crude rubber. The total shipments for the period January 1 to September 30, 1936, came to 24,981,590 kilos.

Howard Anderson, Well Known in the Rubber Industry, Caught in a Playful Mood while Vacationing at Bayhead, N. J., Last Summer

INDIA

Exports of crude rubber from South India ports the first nine months of 1936 totaled 17,661,526 pounds; 13,480,373 went to foreign countries and 4,181,153 to other parts of India.

OHIO

(*Continued from page* 64)

signed by Goodrich where no water pressures are available.

Many farm tractors equipped with rubber tires are operated in freezing weather, and for these Goodrich engineers recommend solutions of commercial calcium chloride, ordinarily used for dust-laying on roads.

The tire should be filled with liquid until the level reaches the inflation valve. After that amount has been put into the tire, inflation with air should be effected, just as in ordinary practice. The air pressures in tires in which water is used are the same as the regular pressure.

The amount of water put into the tire ranges from 13.80 gallons for the 7.50-24 four-ply size to 53.30 gallons for the 12.75-32 six-ply size.

NEW JERSEY

(*Continued from page* 65)

The Flintkote Co., Inc., East Rutherford, has notified the New York Stock Exchange that P. C. Rowe was elected a member of the executive committee on January 6

Pequanoc Rubber Co., manufacturer of reclaimed rubber, Butler, has built a complete new boiler plant and is arranging for additions to prepare for an experimental process of reclaimed rubber that has some decided advantages over the present method, but the details are not available as yet.

Milk Bottle Caps

Safety caps for milk bottles in white heavy molded rubber are now available as inexpensive yet positive and convenient means for keeping bottled milk free from contamination by dust, dirt, and the absorption of odors from other foods when stored in the refrigerator. Many other foods and household liquids may be kept sealed airtight by this easily removable device, known as the Safety Kap. In placing the cap on the bottle press down its center with the thumb, thus raising the heavy outer lip to create a vacuum and produce airtight sealing. United Sales & Mfg. Corp.

Patents and Trade Marks

MACHINERY

United States

2,061,020 and 2,061,021. **Elastic Yarn Apparatus.** F. D. Chittenden, Providence, and K. J. Rupprecht, Barrington, both in R. I., assignors to United States Rubber Products, Inc., New York, N. Y.

2,061,053. **Cementer.** E. A. Willey and E. F. Casey, assignors to Converse Rubber Co., all of Malden, Mass.

2,061,118. **Regulator.** W. H. Vogt, assignor to Taylor Instrument Cos., both of Rochester, N. Y.

2,061,407. **Extruder.** V. E. Royle, Paterson, N. J.

2,061,581. **Cylinder Trimmer.** W. A. Lippincott, Oak Park, assignor to Ideal Roller & Mfg. Co., Chicago, both in Ill.

2,061,654. **Valve Stem Base Machine.** W. F. Goff, Akron, and E. F. Tobold, Cleveland, assignors to Dill Mfg. Co., Cleveland, all in O.

2,061,749. **Rubber Thread Apparatus.** C. L. Beal, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

2,061,893. **Printing Apparatus.** J. E. Cady, Indianapolis, Ind., assignor to United States Rubber Products, Inc., New York, N. Y.

2,062,008. **Uniform Tension Device.** A. P. Lewis, Fair Haven, Mass., and W. J. Secrest, Cuyahoga Falls, assignors to Firestone Tire & Rubber Co., Akron, both in O.

2,062,871. **Stitcher.** M. L. Engler, assignor to General Tire & Rubber Co., both of Akron, O.

2,062,926. **Knitting Machine Feeder.** A. E. and F. R. Page, both of Brooklyn, N. Y., and H. N. Sheppard, Maplewood, N. J., assignors to Scott & Williams, Inc., New York, N. Y.

2,062,999. **Elastic Fabric Apparatus.** F. W. Plumb, assignor to Narrow Fabric Co., both of W. Reading, Pa.

2,063,019. **Garter Tab Maker.** L. H. Bardach, Hartford, Conn., and N. H. Curtiss, Passaic, N. J., assignors to United States Rubber Products, Inc., New York, N. Y.

2,063,037. **Inking Roll Surfacer.** B. W. Hubbard, Oak Park, assignor to Ideal Roller & Mfg. Co., Inc., Chicago, both in Ill.

2,063,041. **Device to Apply Pressure to Shoe Bottoms.** L. G. Knowles, Beverly, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

2,063,069. **Tire Vulcanizer.** H. K. Wheelock, Long Beach, Calif.

2,063,172. **Device to Apply Pressure to Shoe Bottoms.** J. T. Lancaster, Newton, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

2,063,894. **Tire Groover.** D. Jack and W. Matisek, assignors of ¼ to said Matisek, ½ to Allied Manufacturers, Inc., all of Detroit, and ¼ to E. E. Staub, Grosse Pointe Park, all in Mich.

2,064,416. **Vulcanizer Adapter.** R. G. Daniel, Beverly Hills, Calif.

2,064,508. **Rubber Thread Apparatus.** E. Vincke, Palamos, Spain.

2,064,778. **Tire Mold.** R. C. Bateman, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,064,793. **Fabric Centerer.** J. P. Griggs, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

362,033. **Extensible Material Tester.** Dunlop Rubber Co., Ltd., London, assignee of H. Willshaw and G. C. Brentnall, co-inventors, both of Birmingham, all in England.

362,115. **Sponge Rubber Blower.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. J. Randall, Naugatuck, Conn., U. S. A.

362,395. **Hot Knife.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of J. R. Gammeter, Akron, O., U. S. A.

362,493. **Rubber Product Machine.** H. Mazzeo, Buenos Aires, Argentina.

362,614. **Shoe Sole Attaching Apparatus.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of J. T. Lancaster, Newton, Mass., U. S. A.

United Kingdom

450,111. **Tire Builder.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)

450,243. **Shoe Mold.** J. H. Coffey, Rhos-on-Sea.

450,337. **Tube Hole Puncher.** Dunlop Rubber Co., Ltd., London, and H. Willshaw and M. Turner, both of Birmingham.

450,434 and 450,435. **Latex Settling Tank.** W. Kellitt, Siliou, F. M. S.

450,437. **Chewing Gum Mold.** C. A. Jensen, London. (Chewing Gum Machinery Corp., Philadelphia, Pa., U. S. A.)

450,732. **Pouch Dipping Mold.** A. N. Spanel, Rochester, N. Y., U. S. A.

450,845 and 450,920. **Long Length Article Mold.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

Germany

639,339. **Apparatus to Cover Fabric with Rubber.** Ungarische Gummiwaarenfabriks A.G., Budapest, Hungary. Represented by J. Reitstotter, Berlin.

639,546. **Rubber Thread Apparatus.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

639,547. **Tubing Cutter.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., London, England. Represented by F. Meffert, L. Sell, and E. Schlumberger, all of Berlin.

639,548. **Footwear Mold.** Helsingborgs Gummifabriks Aktiebolag, Helsingborg, Sweden. Represented by G. Bueren, Berlin.

640,289. **Tire Indicator.** E. Redel, Berlin-Neukolln.

PROCESS

United States

2,060,961. **Glove.** N. E. Tillotson, Watertown, Mass.

2,060,962. **Ball.** D. F. Twiss and W. McGowan, both of Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.

2,061,098. **Waterproofing Masonry.** A. A. Johnson, Great Neck, N. Y., assignor to Johnson-March Corp., a corporation of Del.

2,061,296 and 2,061,297. **Shoe.** W. H. Wedger, Belmont, assignor to Boston Blacking & Chemical Co., Boston, both in Mass.

2,061,392. **Packing Gasket.** H. T. Wheeler, Dallas, Tex.

2,061,604. **Ball.** H. T. Winterbauer, assignor, by direct and mesne assignments, to John T. Clark Co., both of Chicago, Ill.

2,061,748. **Coated Creped Paper.** E. H. Angier, assignor to E. H. Angier, as trustee under Agreement and Declaration of Trust, designated as Angier Laboratories, both of Framingham, Mass.

2,061,918 and 2,061,919. **Brake Lining.** W. Nanfeldt, Clifton, assignor to World Bestos Corp., Paterson, both in N. J.

2,062,147. **Baseball.** E. A. Robinson, assignor to Collette Mfg. Co., both of Amsterdam, N. Y.

2,062,178. **Impregnating.** G. S. Hiers, Bala-Cynwyd, assignor to Collins & Aikman Corp., Philadelphia, both in Pa.

2,063,685. **Abrasive Wheel.** M. B. Lane, Holden, assignor to Norton Co., Worcester, both in Mass.

2,063,889. **Coating Insulated Wire.** A. T. Candy, Jr., Oak Park, assignor to Candy & Co., Inc., Chicago, both in Ill.

2,064,073. **Impregnating Leather with Rubber.** A. McLennan, Chesterfield, assignor to O. C. Hartridge, London, both in England.

2,064,143. **Rubber Glove.** P. L. and O. L. Belton, both of Barberton, assignors to Seiberling Latex Products Co., Akron, all in O.

Dominion of Canada

361,798. **Applying Rubber to Fabric.** T. L. Shepherd, London, England.

361,962. **Punctureproof Inner Tube.** C. P. Soper, assignee of J. W. Waber, both of Chicago, Ill., U. S. A.

362,655. **Coated Sheet Material.** Marathon Paper Mills Co., Rothschild, assignee of A. Abrams and C. L. Wagner, co-inventors, both of Wausau, all in Wis., U. S. A.

362,656. **Laminated Sheet Material.** Marathon Paper Mills Co., Rothschild, assignee of A. Abrams, C. L. Wagner, and G. W. Forcey, co-inventors, all of Wausau, all in Wis., U. S. A.

United Kingdom

450,151. **Sports Track.** G. E. Bowser, and W. Harding, both of Leicester.
450,350. **Model.** Rohm & Haas A. G., Darmstadt, Germany.
450,867. **Relief Map.** J. E. C. De V. Pereira, Lisbon, Portugal.
450,912. **Waterproofing Shoes.** R. Very, Ille et Vilaine, France.

Germany

639,430. **Colored, Hollow Goods.** Continental Gummi-Werke A.G., Hannover.
639,545. **Rubber Thread.** L. W. Joyce, Greensboro, N. C., U. S. A. Represented by L. Schmetz, Aix-la-Chapelle.
639,549. **Two-Ply Soling.** E. Kubler & Co., m.b.H., Berlin-Reinickendorf.
639,642. **Stabilizing and Drying Creamed Latex.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth, and C. Weihe, all of Frankfurt a.M., and T. R. Koehnhorn, Berlin.
639,741. **Making Inflatable Toys.** F. Nadherny, Vienna, Austria. Represented by G. Bueren, Berlin.
639,794. **Smooth, Dull Surface on Latex Goods.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.
640,178. **Vulcanizing Belting, Sheets, Etc.** A/S Den Norske Remfabrik, Oslo. Represented by H. Joseph, Berlin.

CHEMICAL

United States

2,061,111. **Antioxidant.** D. R. Stevens, Swissvale, and W. A. Gruse, Wilkinsburg, assignors, by mesne assignments, to Gulf Oil Corp., Pittsburgh, all in Pa.
2,061,127. **Fabric Coating.** A. M. Alvarado, R. B. Flint, and L. P. Hubbuch, assignors to E. I. du Pont de Nemours & Co., all of Wilmington, Del.
2,061,276. **Rubber Treatment.** J. H. Ingmanson, Rahway, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.
2,061,451. **Age Resister.** A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
2,061,520. **Accelerator.** L. Orthner, Leverkusen-I. G. Werk, and M. Bogemann, Cologne-Mulheim, assignors to I. G. Farbenindustrie A. G., Frankfurt a. M., all in Germany.
2,061,523. **Sulphur.** C. H. Smith, Tallmadge, O., assignor to Wingfoot Corp., Wilmington, Del.
2,061,531. **Age Resister.** W. D. Wolfe, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.
2,061,674. **Antifreeze Belt Compound.** J. Rockoff, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
2,061,779. **Age Resister.** W. L. Semon, Silver Lake Village, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,061,934. **Rubber Composition.** M. Mueller-Cunradi and K. Pieroh, both of Ludwigshafen a. Rhine, assignors to I. G. Farbenindustrie A. G., Frankfurt a. M., all in Germany.
2,062,159. **Dispersible Carbon Black.** A. A. Brizzolara, New York, N. Y., E. L. Duhring, Plainfield, and A. M. Erskine, Chatham, both in N. J., assignors, by mesne assignments, to E. I. du Pont de Nemours & Co., a corporation of Del.
2,062,358. **Carbon Black.** P. K. Frolich, Roselle, N. J., assignor to Standard Oil Development Co., a corporation of Del.
2,062,885. **Age Resister.** J. R. Ingram, Nitro, W. Va., assignor, by mesne assignments, to Monsanto Chemical Co., St. Louis, Mo.
2,063,073. **Hydrogenated Rubber Aqueous Dispersion.** A. M. Alvarado, assignor to E. I. du Pont de Nemours & Co., both of Wilmington, Del.
2,063,835. **Chemically-Resistant Material.** M. K. Billson, assignor to Hawaiian Hume Concrete Pipe Co., Ltd., both of Honolulu, T. H.
2,063,982. **Stabilized Rubber Latex.** H. M. Bunbury, Prestwich, and R. B. F. F. Clarke, Cheadle Hulme, both in England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
2,064,580. **Plasticizing Rubber.** I. Williams, Woodstown, and C. C. Smith, Carneys Point, both in N. J., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.
2,064,752. **Age Resister.** J. R. Ingram, Nitro, W. Va., assignor, by mesne assignments, to Monsanto Chemical Co., St. Louis, Mo.
2,064,763. **Rubber Derivative.** T. C. Morris, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,064,782, 2,064,783, and 2,064,784. **Thiazyl Derivative.** H. I. Cramer, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

361,831. **Accelerator.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. F. Tuley, Nutley, N. J., U. S. A.
361,856. **Whiting.** Pure Calcium Products Co., assignee of J. W. Church and R. R. McClure, co-inventors, all of Painesville, O., U. S. A.
362,065. **Lubricating Grease.** Shell Development Co., San Francisco, assignee of E. N. Klemgard, Martinez, both in Calif., U. S. A.
362,233. **Fabric Coating.** Canadian Industries, Ltd., Montreal, P. Q., assignee of A. M. Alvardo and H. J. Barrett, co-inventors, both of Wilmington, Del., U. S. A.
362,444. **Rubber Coloring.** I. G. Farbenindustrie A. G., Frankfurt a. M., assignee of G. Niemann and L. Kollek, co-inventors, both of Ludwigshafen a. Rhine, all in Germany.
362,541, 362,542, and 362,543. **Molding Composition.** Barrett Co., New York, N. Y., assignee of A. B. Cowdery, Needham, Mass., both in the U. S. A.
362,640. **Plastic Composition.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. E. Brooks, Nutley, N. J., U. S. A.

United Kingdom

450,021. **Coloring Rubber.** Imperial Chemical Industries, Ltd., London, and W. G. Reid and W. A. Sexton, both of Manchester.
450,218. **Rubber-like Composition.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.
450,222. **Latex Treatment.** Rubber Producers Research Assn., G. Martin, W. S. Davey, and H. C. Baker, all of London.
450,232. **Fabric Coating.** Thurm & Beschke Kommandit-Ges., Prague, Czechoslovakia.
450,289. **Concentrating Latex.** Metallges. A. G., Frankfurt a. M., Germany.
450,323. **Age Resister.** Rubber Service Laboratories Co., Akron, O., U. S. A.
450,379. **Accelerator.** J. Fromm, Berlin, Germany.
450,450. **Improving Carbon Black.** W. B. Wiegand, New York, N. Y., U. S. A.
450,454. **Coating Composition.** Celluloid Corp., Newark, N. J., U. S. A.
450,681. **Fire-resistant Rubber Composition.** Liverpool Electric Cable Co., Ltd., and A. E. Hughes, London.
450,683. **Chlorinated Rubber Composition.** C. R. Barsby, Liverpool, H. R. L. Streight, Runcorn, and Imperial Chemical Industries, Ltd., London.
450,876. **Carbon Black.** Coutts & Co., London, and F. Johnson, Eastbourne, (representative of J. Y. Johnson). (I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.)
450,891. **Rubber Composition.** Celluloid Corp., Newark, N. J., U. S. A.
450,945. **Rubber Composition.** H. Ziegner, Hagen, Germany.
450,951. **Bituminous Coating Composition.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

Germany

638,617. **Concentrating Latex.** Metallgesellschaft A.G., Frankfurt a.M.
639,590. **Antiager.** B. F. Goodrich Co., New York, N. Y., U. S. A. Represented by G. Bertram and K. Lengner, both of Berlin.
639,793. **Aqueous Rubber Dispersions.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

GENERAL

United States

2,060,784. **Engine Mounting.** J. A. Bent, Detroit, Mich.
2,060,823. **Gas Mask Eyepiece.** T. A. O'Leary, Pittsburgh, Pa.
2,060,847. **Sealing Means.** H. C. Bowen, assignor to Hydraulic Brake Co., both of Detroit, Mich.
2,060,866. **Container Vent.** P. Hetenyi, New York, N. Y., assignor to Solar Mfg. Corp., a corporation of N. Y.
2,060,899. **Pump.** A. O. Russell, White Plains, N. Y.
2,060,906. **Uniting Materials.** J. E. Snyder, Kenmore, N. Y., assignor by mesne assignments, to E. I. du Pont de Nemours & Co., Wilmington, Del.
2,060,913. **Electrical Conductor.** L. L. Weaver, Cranford, N. J., assignor to Western Electric Co., Inc., New York, N. Y.
2,060,914. **Electrical Conductor.** L. L. Weaver, Cranford, and C. A. Webber, Westfield, both in N. J.; said Weaver assignor to Western Electric Co., Inc., New York, N. Y., and said Webber assignor to Bell Telephone Laboratories, Inc., New York, N. Y.
2,060,915. **Unit Sealing and Guide Strip for Glass Run Channel.** F. J. Westrope, Detroit, Mich., assignor to Murray Corp. of America, a corporation of Del.

2,060,931. **Shelf Support.** P. Fischer, Palo Alto, Calif.

2,060,941 and 2,060,942. **Shipping and Storing Receptacle.** W. Kline, Wellington, and W. A. Brubaker, Akron; said Kline assignor to E. H. Morrison, Wellington, all in O.

2,060,987. **Ball.** J. H. Grady, assignor to J. H. Grady Mfg. Co., both of St. Louis, Mo.

2,060,998. **Brassiere.** M. Martin, Riverside, assignor to H. W. Gossard Co., Chicago, both in Ill.

2,061,072. **Machine Gun Cartridge Belt.** J. A. Hendley, assignor to Russell Mfg. Co., both of Middletown, Conn.

2,061,073. **Elastic Tape.** J. A. Hendley, assignor to Russell Mfg. Co., both of Middletown, Conn.

2,061,074. **Jar Holding Device.** C. Holtz, deceased, by L. Holtz, executrix, both of Minneapolis, Minn.

2,061,124. **Collapsible Tube Closure.** G. J. Walther, Winona, Minn.

2,061,145. **Inspection Cover.** J. F. Duffy, assignor to Duffy Mfg. Co., both of Holland, Mich.

2,061,160. **Shoe Protector.** E. T. Kendall, Oxnard, Calif.

2,061,190. **Plug Connecter.** E. O. Ericson, Cleveland Heights, O.

2,061,219. **Automobile Washing Device.** C. L. Wright, Monroe, N. Y.

2,061,268. **Breast Mold.** N. Becker, Nice, France.

2,061,274. **Tire Wrench.** E. Horn, East Falls, Pa.

2,061,283. **Tractor Tire Lug.** L. A. Lilly, Plainwell, Mich.

2,061,324. **Tire for Mine Locomotive.** L. G. Michael, and P. Brumbach, Harlan; said Michael assignor to R. B. Maw, Pineville, all in Ky.

2,061,356. **Hair Waver.** D. Gosewisch, St. George, N. Y.

2,061,366. **Pipe End Protector.** H. R. Mazurie, Pittsburgh, Pa., assignor to National Tube Co.

2,061,375. **Bag.** J. D. Cramer, Goshen, Ind., assignor to Chase Bag Co., New York, N. Y.

2,061,405. **Fountain Pen.** R. B. Kingman and R. L. Hartwell, both of Orange, N. J.; said Hartwell assignor to said Kingman.

2,061,418. **Temperature Control Device.** W. J. Ettinger, assignor to Edison General Electric Appliance Co., both of Chicago, Ill.

2,061,419. **Temperature Control Device.** W. J. Ettinger, Chicago, and N. Miller, La Grange, assignors to Edison General Electric Appliance Co., Chicago, all in Illinois

2,061,436. **Gas Mask Construction.** T. A. O'Leary, Pittsburgh, Pa.

2,061,477. **Nursing Bottle.** E. N. Perry, Lowell, Mass.

2,061,505. **Apparatus to Purify Caustic Hydroxide.** B. W. Collins, Swarthmore, assignor to Viscose Co., Marcus Hook, both in Pa.

2,061,509. **Impregnated Article.** W. W. De Laney, Marshallton, assignor to Hercules Powder Co., Wilmington, both in Del.

2,061,522. **Inner Tube.** W. E. Shively, Fairlawn, O., assignor to Wingfoot Corp., Wilmington, Del.

2,061,528. **Electrical Insulation.** E. W. Trolander and W. C. Wilson, assignors to Pyroxylin Products, Inc., all of Chicago, Ill.

2,061,553. **Flushing Device.** M. B. Acosta, Los Angeles, Calif.

2,061,569. **Composition Sheet** A. C. Fischer, Chicago, Ill.

2,061,630. **Necktie.** W. A. Keys, New York, N. Y.

2,061,649. **Storage Battery Vent Plug.** S. T. Campbell, assignor to Aetna Rubber Co., both of Cleveland, O.

2,061,651. **Vehicle Spring.** C. W. Clauson, Brookline, Mass.

2,061,664. **Sanitary Crepe Rubber Cushion.** E. K. Lincoln, Fairfield, Conn.

2,061,760. **Windshield Division Molding.** A. J. Fisher, assignor to General Motors Corp., both of Detroit, Mich.

2,061,767. **Car Truck.** R. C. Hobson, Willoughby Township, assignor to National Malleable & Steel Castings Co., Cleveland, both in O.

2,061,794 and 2,061,795. **Pressure Regulator.** G. M. Deming, E. Orange, N. J., assignor to Air Reduction Co., Inc., New York, N. Y.

2,061,806. **Shock Absorbing Device.** W. Noble, Michigan City, Ind., assignor to Sullivan Machinery Co., a corporation of Mass.

2,061,809. **Teat Cup Liner.** W. A. Scott, Poughkeepsie, assignor to De Laval Separator Co., New York, both of N. Y.

2,061,817. **Hair Curler.** P. Van Cleef, assignor to Van Cleef Bros., both of Chicago, Ill.

2,061,838. **Conveying and Driving Belt.** H. S. Johns, N. Grimsby Township, Ont., Canada.

2,061,851. **Tire Boot.** L. R. Saferite, Los Angeles, assignor to one-half to E. G. Leap, Merced, both in Calif.

2,061,857. **Overhead Rail.** F. Spurrier, Berkeley, Calif.

2,061,905. **Flexible Diaphragm.** E. E. Hewitt, Edgewood, assignor to Westinghouse Air Brake Co., Wilmerding, both in Pa.

2,061,985. **Axle Construction.** C. Saurer, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,062,063. **Horse Collar.** H. C. Kirby, Sunbury, O.

2,062,114. **Heel Cushion.** S. F. Bashara, Houston, Tex.

2,062,123. **Shoe Protecting Device.** Z. R. Everett and K. F. V. Nygaard, both of Philadelphia, Pa.

2,062,131. **Garment.** J. Hirsch, assignor to Kops Bros., Inc., both of New York, N. Y.

2,062,162. **Fountain Pen.** L. Chayka, Detroit, Mich.

2,062,166. **Game Apparatus.** J. Delwiche, New York, N. Y.

2,062,220. **Tire Inflating and Deflating Apparatus.** W. A. Harris, Greenville, S. C.

2,062,247 and 2,062,248. **Football Bladders.** A. F. Heck, assignor to Collette Mfg. Co., both of Amsterdam, N. Y.

2,062,317. **Roll.** J. F. Joseph, Cincinnati, assignor to Cincinnati Rubber Mfg. Co., Norwood, both in Ohio.

2,062,325. **Mask.** F. G. Manson, Dayton, O.

2,062,400. **Watertight Box Connecter.** P. N. Dann, assignor to Rattan Mfg. Co., both of New Haven, Conn.

2,062,435. **Device to Detect Refrigerant Leaks.** A. Weiland, Philadelphia, Pa., assignor to Baldwin-Southwark Corp., a corporation of Del.

2,062,469. **Auto Top Material.** R. Morgan, Fairfield, Conn., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

2,062,493. **Shoe.** M. J. Bernstein, Brighton, assignor to Panther-Panco Rubber Co., Inc., Chelsea, Mass.

2,062,568. **Cog Belt.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,062,572. **Heel.** A. Hannabach, Pittsburgh, Pa.

2,062,638. **Valveless Inflatable Article.** N. D. Campbell, Hackensack, N. J.

2,062,713. **Fire Extinguisher Handle.** V. J. Hill, Jr., assignor to Walter Kidde & Co., Inc., both of Bloomfield, N. J.

2,062,742. **Tank Top Tray.** S. R. Davis, Detroit, Mich.

2,062,808. **Piston.** J. H. Davis, Dallas, Tex.

2,062,833. **Suspenders.** H. Schiller, New York, N. Y.

2,062,834. **Respirator Filtering Device.** N. Schwartz, New York, N. Y.

2,062,919. **Marine Fender.** E. F. Maas, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.

2,063,038. **Attachment Plug Cap.** H. Hubbell, Jr., Bridgeport, Conn.

2,063,081. **Molded Cushion.** F. O. Church, assignor to Dunlop Tire & Rubber Corp., both of Buffalo, N. Y.

2,063,084. **Scalp Invigorator.** W. P. and H. J. Farnon, both of San Diego, assignors of one half to W. A. Monten, Los Angeles, all in Calif.

2,063,095. **Street Lamp.** G. B. and G. F. Heath, both of St. Louis, Mo.

2,063,100. **Ice Tray Grid.** B. Johnsen, Brooklyn, N. Y.

2,063,105. **Tire Cover.** F. G. W. King, Sutton Coldfield, England, assignor to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

2,063,132. **Dust Mop Bumper.** A. D. Sund, Santa Rosa, Cali.

2,063,202. **Uterine Vent.** C. R. Spicer, Hastings, Nebr.

2,063,227. **Shoe.** I. B. Calvin, Akron, O.

2,063,232. **Bathing Cap.** P. A. W. Davies, Otane, New Zealand.

2,063,382. **Rupture Supporting Device.** J. G. Homan, Steubenville, O.

2,063,397. **Nebulizer.** B. S. Paschall, Seattle, Wash.

2,063,424. **Nipple.** E. Ferguson, Spokane, Wash.

2,063,430. **Liquid Dispenser.** T. T. Graser, assignor of one half to E. D. Lichtenberg, both of Syracuse, N. Y.

2,063,452. **Tire Pressure Indicator.** J. W. McDonnell, Palo Alto, Calif.

2,063,608. **Roll.** A. C. Lade, Northampton, assignor to B. F. Perkins & Son, Inc., Holyoke, both in Mass.

2,063,617. **Spreader Cap for Adhesive Containers.** G. E. Nealand, Newburyport, assignor to Carter's Ink Co., Cambridge, both in Mass.

2,063,758. **Laminated Rubber Mounting.** E. O. Schjolin, Pontiac, assignor to General Motors Corp., Detroit, both of Mich.

2,063,863. **Well Pump.** A. C. Zimmerman and E. F. Steger, assignors to Duro Co., all of Dayton, O.

2,063,871. **Tire Alarm.** M. C. French, Brighton, Colo.

2,063,886. **Waist Band.** P. Alexandre, Strasbourg, France.

2,063,957 and 2,063,958. **Bumper Construction.** B. M. Short, assignor to General Spring Bumper Corp., both of Detroit, Mich.

2,063,967. **Compression Joint.** B. B. Whittam, Akron, O.

2,064,004. **Sheet Feeder.** W. R. Hotchkiss, St. Paul, Minn.

2,064,128. **Surfboard.** E. E. Smithers, Sydney, N. S. W., and C. D. Richardson, Brisbane, Queensland, both in Australia.

2,064,134. **Stair Tread Mat.** E. W. Weiland, Rochester, N. Y.
2,064,137. **Spring Base Furniture.** L. J. Zerbee, Bellefontaine, O.
2,064,222. **Fastener.** L. Roseman, Newark, N. J.
2,064,235. **Packing.** H. T. Wheeler, Dallas, Tex.
2,064,248. **Hot Water Bag Electric Heating Attachment.** W. Doyon, Detroit, Mich.
2,064,249. **Garment.** F. Ebert, assignor to Mauser-Werke A.-G., both of Oberndorf-on-the-Neckar, Germany.
2,064,266. **Garment.** W. Murphey, Chattanooga, Tenn.
2,064,309. **Toy Vehicle.** R. Lohr, Erie, Pa., assignor to L. Marx & Co., Inc., New York.
2,064,326. **Cable.** C. Tietig, assignor to Kelley-Koett Mfg. Co., both of Covington, Ky.
2,064,527. **Sealing Means for Pneumatic Springs.** E. Ericsson, St. Paul, Minn.
2,064,554. **Separator.** J. P. Mahoney and L. E. Long, assignors to Bendix Aviation Corp., all of South Bend, Ind.
2,064,566. **Dog Boot.** D. Richman, New York, N. Y.
2,064,594. **Laundry Net.** R. L. Dickey, Upper Montclair, N. J., assignor to United States Rubber Products, Inc., New York, N. Y.
2,064,619. **Syringe.** C. E. and G. E. Leonard, both of Bethlehem, Pa.
2,064,692. **Brake Rod Cushion.** C. Shank, assignor of one half to J. R. Bruce, both of Goshen, Ind.
2,064,694. **Tire.** H. R. Simonds, Oakwood, O.
2,064,695. **Valve.** H. E. Sipe, assignor of one half to N. L. Foster, both of New York, N. Y.
2,064,711. **Heel.** E. Yeager, Farmington, Mich.
2,064,726. **Atomizer.** W. R. Brown, Harrisburg, Pa.
2,064,767. **Container.** H. R. Thies, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,064,768. **Insulation.** H. R. Thies, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,064,780. **Printer's Blanket.** W. C. Calvert, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.
2,064,781. **Belt.** H. E. Collins, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,064,801. **Elastic Yarn.** F. D. Chittenden, Providence, R. I., assignor to United States Rubber Products, Inc., New York, N. Y.
2,064,803. **Wall Step.** C. W. Grove, Cleveland, O.

Dominion of Canada

361,795. **Anti-Skid Device.** A. F. Roth, Wilkes-Barre, Pa., U. S. A.
361,805 and 361,806. **Chair Iron.** Bassick Co., assignee of W. F. Herold, both of Bridgeport, Conn., U. S. A.
361,817. **Mat.** Canadian National Institute for the Blind, Toronto, Ont., assignee of R. G. Peter, Vancouver, B. C.
361,832. **Tire.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. Eger, Detroit, Mich., U. S. A.
361,835. **Suction Cleaner.** P. A. Geier Co., assignee of E. F. Martinet, both of Cleveland, O., U. S. A.
361,917. **Resilient Connection for Wheels.** Svenska Aktiebolaget Bromsregulator, assignee of N. G. A. Malmquist, both of Malmo, Sweden.
362,086. **Protective Covering.** H. Dreyfus, assignee of W. H. Moss, both of London, England.
362,118. **Pile Fabric.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of Naugatuck Chemical Co., Naugatuck, Conn., U. S. A., assignee of E. Hopkinson, deceased, late of New York, N. Y., U. S. A.
362,137. **Fountain Pen.** L. E. Waterman Co., New York, N. Y., assignee of R. B. Watson, Colorado Springs, Colo., both in U. S. A.
362,183. **Rubber Bag.** A. N. Spanel, Rochester, N. Y., U. S. A.
362,196. **Game Apparatus.** C. W. Auger, Liverpool, England.
362,211. **Saddle Seat.** H. M. Pryale, Pontiac, Mich., U. S. A.
362,256. **Valve Stem.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. Eger, Grosse Pointe Park, Mich., U. S. A.
362,282. **Garment.** United States Rubber Co., New York, assignee of P. Adamson, Rye, N. Y., U. S. A.
362,299. **Tire.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. W. Bull, Grosse Pointe, Mich., U. S. A.
362,300. **Pipe Joint.** B. F. Goodrich Co., New York, N. Y., assignee of T. D. Nathan, Cuyahoga Falls, O., both in U. S. A.
362,346. **Milk Bottle Cap.** J. R. Gammeter, Akron, O., U. S. A.
362,353. **Overshoe and Overstocking.** M. Pilkington, Regina, Sask.
362,384. **Nipple.** Davol Rubber Co., Providence, assignee of J. Little, Warwick, both in R. I., U. S. A.
362,387. **Moistureproof Material.** Du Pont Cellophane Co., Inc., Wilmington, Del., assignee of A. Hershberger, Kenmore, N. Y., both in U. S. A.
362,393. **Joint Assembly.** Houde Engineering Corp., assignee of R. F. Peo, both of Buffalo, N. Y., U. S. A.
362,426. **Flexible Band.** R. H. Wilbur, Melrose, assignee of J. D. Lane, Boston, both in Mass., U. S. A.
362,452. **Brake Lining.** Johns-Manville Corp., New York, N. Y., assignee of P. D. Cannon, Bound Brook, N. J., both in U. S. A.
362,453. **Brake Lining.** Johns-Manville Corp., New York, N. Y., assignee of J. Driscoll, Plainfield, N. J., both in U. S. A.
362,455. **Sliding Fastener.** Lightning Fastener Co., Ltd., St. Catharines, Ont., assignee of J. L. Larroque, Rouen, France.
362,470. **Belt.** Wingfoot Corp., Wilmington, Del., assignee of E. G. Kimmich, Akron, O., both in U. S. A.
362,476. **Gasket Ring.** F. Marx and O. Moglich, both of Wetzlar an der Lahn, Germany.
362,533. **Corn Pad.** W. M. Scholl, Chicago, Ill., U. S. A.
362,551. **Weatherproof Armored Cable.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. Carlson, Bridgeport, Conn., U. S. A.
362,552. **Weatherproof Armored Cable.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of H. G. Knoderer, Fairfield, Conn., U. S. A.
362,632. **Cable.** American Steel & Wire Co. of New Jersey, Cleveland, O., assignee of J. J. Morrison, Worcester, Mass., both in U. S. A.
362,634. **Shoe.** Cambridge Rubber, Ltd., St. Remi de Napierville, P. Q., assignee of E. W. Dunbar, Hudson, Mass., U. S. A.
362,654. **Knitted Fabric.** Lawson Knitting Co., Central Falls, assignee of J. Lawson, Bristol, both in R. I., U. S. A.

United Kingdom

450,112. **Paper Machine Suction Apparatus.** Thames Board Mills., Ltd., Purfleet, and W. G. Fiske, Upminster.
450,123. **Ball Game.** R. Heimers, Mexico, D. F., Mexico.
450,129. **Refuse Receptacle Cover.** Fiat Soc. Anon., Turin, Italy.
450,147. **Syringe.** Sharp & Dohme, Inc., Philadelphia, Pa., U. S. A.
450,166. **Vehicle Endless Track.** W. J. Tennant, London. (Tatra Works Ltd., Motor Car & Railway Carriage & Wagon Builders, Prague, Czechoslovakia.)
450,181. **Pipe Joint.** H. E. McMillan, Littleover.
450,202. **Hair Waver.** S. Kallmann, Paris, France.
450,229. **Electric Hair Waver.** Kadus-Werk Ges., Neustadt, Germany.
450,231. **Tire Deflation Indicator.** R. Mercadier, Clamart, and A. Pouget, Villacoublay, both in France.
450,259. **Ventilator.** Pressed Steel Co., Ltd., Cowley, and W. Swallow, Headington.
450,268. **Steering Wheel.** Wilmot-Breeden, Ltd., and C. L. Breeden, both of Birmingham.
450,343. **Fountain Pen.** Namiki Mfg. Co., Ltd., London. (Kabushiki Kaisha Namiki Seisakusho, Tokio, Japan.)
450,345. **Gas Mask.** Dognin Soc. Anon., Villembanne, France.
450,355. **Life Saving Jacket.** Winckler Engineering Laboratories, Inc., Boston, Mass., U. S. A., assignee of G. A. F. Winckler.
450,363. **Stringed Musical Instrument.** L. Tertis, Sutton.
450,369. **Respirator.** Mine Safety Appliances Co., Pittsburgh, Pa., U. S. A., assignee of C. W. Punton and J. B. Dym.
450,384. **Endless Track Vehicle.** A. Kegresse, Paris, France.
450,389. **Friction Clutch.** H. Muller, Dessau, Germany.
450,399. **Link Mat.** W. S. Bauer, London.
450,418. **Pipe Joint.** Twyfords, Ltd., and J. T. Webster, both of Hanley.
450,474. **Bath Overflow Device.** P. G. Donald, London.
450,497. **Pipe Leak Indicator.** F. Konig, Berlin, Germany.
450,536. **Running Shoe.** G. M. Butler, Chipperfield.
450,577. **Athletic Footwear.** A. C. Sayers, Ilford.
450,588. **Belt.** Soc. Du Caoutchouc Manufacture, Paris, France.
450,603. **Vehicle Driving Gear.** S. Smith, Chobham.
450,635. **Non-refillable Bottle.** V. S. Marti, Barcelona, Spain.
450,637. **Corset.** Royal Worcester Corset Co., Worcester, Mass., U. S. A., assignee of N. Imler.
450,689. **Upholstery Padding.** G. W. Chapman, London.
450,734. **Hair Waver.** E. Bennett, Liverpool.

(*Continued on page 76*)

Editor's Book Table

NEW PUBLICATIONS

"Neoprene Heels and Soles." Report N-1. December 15, 1936. E. I. du Pont de Nemours & Co., Inc., Rubber Chemical Division, Wilmington, Del. This eight-page paper pamphlet gives formulas and tests as well as the advantages of the use of Neoprene over rubber or rubber and reclaim for heels and soles worn by workers in places where conditions are detrimental to rubber. Neoprene, incidentally, is the new name for chloroprene rubber formerly sold under the registered trade mark "DuPrene."

Du Pont has changed the form of its literature as compared to the Laboratory Reports previously issued. The change is decidedly for the better. The papers are now printed instead of mimeographed, and their size is reduced to that of *Rubber Chemistry and Technology*. The new pamphlets, moreover, are conveniently punch-holed for easy binding or filing.

"Insulated Wire Compounding—Rubber and Neoprene." Report No. 197, December 15, 1936. E. I. du Pont de Nemours & Co., Inc., Rubber Chemicals Division, Wilmington, Del. In 27 pages, in the new improved format recently adopted by the company for publication of its reports, du Pont gives formulas and physical data tables for insulated wire. Section I shows several code formulas with various percentages of rubber and reclaim and different types of acceleration which should meet the needs of wire manufacturers, whether or not they use the long soapstone pan cure or the short continuous cure. Part II covers Neoprene stocks. Given are a number of formulas, with their physical and aging properties, for specific uses, which are representative of those now giving satisfactory service in their respective fields. At the end of the pamphlet are several pages for notes by the reader.

"Rubber Chemicals Price Schedule. Effective January 1, 1937." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. This 16-page booklet lists prices of the company's compounding ingredients and gives also some general recommendations and brief notes.

"Lewis-Shepard Equipment for Handling. Circular No. 321." Lewis-Shepard Co., 257 Walnut St., Watertown, Mass. In this 12-page folder are illustrated and briefly described equipment for handling barrels, drums, carboys, cartons, etc., including lift trucks, platforms, stands, racks, pourers, and the like.

"The Performance of Unionism in Heavy Industry." By Allen W. Rucker in collaboration with N. W. Pickering, president, Farrel-Birmingham Co., Inc., Ansonia, Conn. In this, No. 19 in a series of booklet-editorials, the authors cover the trend of average annual incomes, security of employment, and purchasing power in six major unionized heavy industries. They conclude that collective bargaining here failed to increase either employment opportunity or labor purchasing power during the prosperous period ending in 1929.

"Technical." General Atlas Carbon Co., 60 Wall St., New York, N. Y. This unusual folder is an invitation to rubber men to secure copies of the firm's technical reports on its carbon black, Gastex.

"Current Trends in Industry." This sixteen-page booklet is a reprint of an address by Paul W. Litchfield, president of The Goodyear Tire & Rubber Co., Akron, O., before the New England Conference, Boston, Mass., November 20, 1936. In it he discussed trends toward social security and decentralization, taxation, and New England's opportunities for industrial enterprises.

"Commodity Exchange, Inc., Fourth Annual Report, November 30, 1936." Commodity Exchange, Inc., 81 Broad St., New York, N. Y. In this report President Floyd Y. Keeler gives a brief review of the past year of the Exchange. Also included is a detailed financial statement.

"A Handbook of Winners." Bike Web Mfg. Co., 41 W. 25th St., Chicago, Ill. This 36-page booklet, besides illustrating and describing the company's athletic products, gives helpful hints on safety, training, and conditioning athletes by outstanding coaches and trainers.

"The Uses of Rubber in Stable Management." Alexander Hay, Agricultural Liaison Officer, The Rubber Growers' Association, Inc., 19 Fenchurch St., London, E.2.3 England. Bulletin No. 5, Rubber and Agriculture Series, November, 1936. This 20-page booklet illustrates and describes rubber goods used for stables and horses, covering such points as stable construction and fittings, horse boxes, pneumatic and rubber padded collars, and saddles, horse shoes and pads, knee caps, boots, and bandages, grooming appliances, stable hose, and pneumatic-tired wheelbarrows.

"Robertson Reminders." Vol. 4, No. 4, December, 1936. John Robertson Co., Inc., 121-35 Water St., Brooklyn, N. Y. This twelve-page colorful booklet, besides conveying the company's holiday greetings, describes by word and picture Robertson equipment, including a lead encasing die block, special presses, a reversing valve assembly, and a hydraulic pump.

"Water Inflation Program." The B. F. Goodrich Co., Akron, O. This six-page circular gives details and advantages of a new means of inflating Goodrich Farm Service Silvertown tires, by water, recommended by the company after a year's study.

"New Horizons for America." An address by Lewis H. Brown, president, Johns-Manville Corp., 22 E. 40th St., New York, N. Y., before the National Association of Manufacturers in conjunction with the Congress of American Industry, December 9, 1936.

"List of Inspected Gas, Oil, and Miscellaneous Appliances, December, 1936." Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. This semi-annual list, covering 120 pages, includes carbon black, cement, machinery, and equipment, hose, gaskets, tubing, packing sheet, etc.

EASTERN

(*Continued from page* 61)

C. S. Snider, in charge of export sales, American Hard Rubber Co., 11 Mercer St., New York, N. Y., on January 5 was guest speaker at the regular luncheon meeting of the Export Managers Club of New York, Inc., at the Hotel Pennsylvania. Mr. Snider, recently returned from a trip to Europe, discussed trade conditions in the countries he visited.

Manhattan College, School of Science students, Bronx, N. Y., have organized a new club, Nieuwland Chemical Society, in honor of the late Rev. Julius Nieuwland, of Notre Dame, discoverer of a process for manufacturing synthetic rubber.

Filatex Corp., 1450 Broadway, New York, N. Y., manufacturer of elastic yarn, plans to move its plant now located in Northampton, Pa., to Trenton, N. J., where the firm recently purchased a building. The new location comprises 21,000 square feet of floor space, a basement and two-story office. The Filatex Corp. is affiliated with the Sylvania Industrial Corp., 122 E. 42nd St., New York.

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NEW MARKETS TO CONQUER. D. D. McLachlan, *Trans. Inst. Rubber Ind.*, Oct., 1936, pp. 216-29.

MACHINERY FOR MIXING AND COMPOUNDING. J. Brown, *Trans. Inst. Rubber Ind.*, Oct., 1936, pp. 230-43.

SECONDARY CHANGES DURING VULCANIZATION OF EBONITE. Part I. L. B. Davis, *Trans. Inst. Rubber Ind.*, Oct., 1936, pp. 244-64.

HEVEA BRAZILIENSIS AS A PRODUCER OF RUBBER. G. Van Iterson, Jr., *India Rubber J.*, Dec. 26, 1936, pp. 869-75; Jan. 9, 1937, pp. 10-15.

MODERN DRIVES FOR RUBBER CALENDERS. F. Grunwald, *Gummi-Ztg.*, Dec. 4, 1936, pp. 1183-84.

BENZENE AND LATEX IN THE MANUFACTURE OF SEAMLESS DIPPED GOODS. *Gummi-Ztg.*, Dec. 11, 1936, pp. 1203-204; December 18, pp. 1228-29. (To be concluded.)

1886-1936: DEVELOPMENT OF THE RUBBER INDUSTRY AS REFLECTED IN THE *Gummi-Zeitung*. *Gummi-Ztg.*, Dec. 4, 1936, pp. 1185-86; Dec. 18, pp. 1231-32.

USE OF ACETYLENE IN THE RUBBER INDUSTRY. P. Walter, *Caoutchouc & guttapercha*, Dec. 15, 1936, pp. 17746-48. (To be continued.)

A NEW COLORIMETER. M. Deribere, *Caoutchouc & gutta-percha*, Dec. 15, 1936, pp. 17757-58.

VISCOSITY OF LATEX AND LATEX COMPOUNDS. O. Bachle, *Kautschuk*, Dec., 1936, pp. 232-35.

REDUCTION OF THE PARTICLE SIZE OF FRESH RUBBER COAGULUM, WITH SPECIAL REFERENCE TO THE MANUFACTURE OF "SOFTENED RUBBER." H. R. Braak, *Chem. Weekblad*, 33, 617-20 (1936).

NEW PROCESSES IN THE TREATMENT OF RAW RUBBER. C. J. Rondberg, *India Rubber J.*, 92, 524-26 (1936).

OIL-RESISTING RUBBER. VII. Swelling of Vulcanized Rubber in Various Liquids. J. R. Scott, *J. Res. Assoc. Brit. Rubber Manufrs.*, 5, 81-115 (1936).

RECENT DEVELOPMENTS IN THE CHEMISTRY OF ACETYLENE IN REGARD TO THE NATIONAL SUPPLY OF RAW MATERIALS, PARTICULARLY RUBBER AND ARTIFICIAL MATERIALS. O. Nicodemus, *Angew. Chem.*, 49, 787-94 (1936).

IMPROVEMENT IN RUBBER INSULATING COMPOUNDS. S. J. Rosch, *Rubber Age (N. Y.)*, Jan., 1937, pp. 219-21.

THE ROLE OF RUBBER IN MANUFACTURING MOVIE PROPS. J. E. Tufft, *Rubber Age (N. Y.)*, Jan., 1937, pp. 223-25.

RUBBER AND CHEWING GUM. H. Barron, *Rubber Age (London)*, Jan., 1937, pp. 368-69.

APPARATUS FOR TESTING COATED FABRICS. R. C. Bowker, *Rayon Textile Monthly*, Jan., 1937, pp. 57, 78.

BOOK REVIEWS

"Evaluating Carbon Black for the Rubber Industry in the Huber Laboratory." J. M. Huber, Inc., 460 West 34th St., New York, N. Y. Cloth, 8 by 10¼ inches, 44 pages, 22 illustrations.

This concisely written book on carbon black for the rubber industry is in four parts. The first, dealing with rubber laboratory standard procedure, covers preparation of rubber stock from compounding to cooling the cured stock. Part II treats of physical tests, including stress-strain tests, aging of rubber stock, abrasion, T-50, flexometer, tear resistance, rebound, plasticity, and dispersion tests, and determination of specific gravity and hardness. Analytical tests, in Part III, deals with volatile matter, accelerator adsorption, acetone extraction, grit, moisture, ash. Part IV is a story in pictures showing the production of carbon black.

As the foreword so aptly expresses it: "This book, illustrating the apparatus and describing the several tests, is not intended to present a discussion as to the significance of results, nor the striking correlation of the various tests; but, rather, it is intended to promote a standardization of tests, their objectives and procedure, and to be generally helpful to those discriminating users of carbon black who will be interested in exploring, with us, the lesser known—through perhaps vitally important—characteristics of the pigment."

This review would not be complete without some word of praise regarding the excellent typography and superb pictures used in this book. Huber is to be congratulated upon the fine job done.

"A.S.T.M. Standards, 1936. Part I. Metals; Part II. Non-Metallic Materials." American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Cloth, 6 by 9 inches. Indexed. Illustrated.

The A.S.T.M. has just issued its 1936 book of standards. This triennial publication contains all the standard specifications, methods of test, recommended practices, and definitions formally adopted by the society. The 1936 issue is in two parts: Part I gives in their latest form all A.S.T.M. standards covering metallic materials; Part II, all standards relating to non-metallic materials. Both parts aggregate 2,400 pages.

In each part the specifications for a particular class of material are given first, followed directly by the test methods, definitions, etc. A complete subject index lists each standard under the principal subject covered, with the keywords in alphabetical sequence. This index, together with two tables of contents, one listing standards by the materials covered, the other in order of sequence of the serial designations, facilitates the use of the book.

"A.S.T.M. Standards on Electrical Insulating Materials. Prepared by Committee D-9 on Electrical Insulating Materials. Specifications and Methods of Tests, September, 1936." Published by American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Paper, 335 pages, 6 by 9 inches. Price $2.

This compilation gives all A.S.T.M. standards pertaining to electrical insulating materials—25 methods of test, 10 specifications—in widespread use for testing and evaluating these materials. This edition includes a number of revised test methods covering the following: varnishes, solid filling and treating compounds, sheet and plate materials, natural mica, untreated paper, insulating oils, and varnished cloths and tapes. Revised specifications cover friction tape, black bias cut varnished tape, and asbestos yarns, tape, and roving.

Standards are also given for rubber gloves, rubber matting, electrical cotton yarns, silk and cotton tapes, pasted mica, slate, rubber insulating tape, flexible varnish tubing, and electrical porcelain. Test procedures cover thickness testing, impact resistance, thermal conductivity and resistivity. The 1936 report of Committee D-9, which is included, outlines the extensive research and standardization work carried on by the committee.

GENERAL

(*Continued from page* 74)

450,741. **Tire.** D. V. Diaz, Oviedo, Spain.

450,798. **Milk Can.** O. V. Jensen, Copenhagen, Denmark.

450,807. **Vehicle Wheel.** Firestone Tyre & Rubber Co., Ltd., Brentford, assignee of W. S. Brink.

450,830. **Squeegee.** H. E. Hambro, Bury St. Edmunds.

450,835. **Vehicle Spring Suspension.** C. Macbeth, Birmingham.

450,853. **Foundation Garment.** M. Kahn, Cedarhurst, N. Y., U. S. A.

450,855. **Battery.** Pritchett & Gold & E.P.S. Co., Ltd., and C. R. Hardy, both of Dagenham Dock.

450,915. **Reeling Machine.** Viscose Co., Marcus Hook, assignee of G. M. Allen, Moylan, and F. F. Long, Chester, all in Pa., U. S. A.

450,977. **Stuffing Box Substitute.** Scovill Mfg. Co., Waterbury, Conn., assignee of S. T. Williams, Bellerose, N. Y., both in the U. S. A.

450,978. **Liquid Aerator.** S. Tucker and Minerals Separation, Ltd., both of London.

Germany

638,631. **Closure for inflatable articles.** Gummiwarenfabrik Carl Plaat, Kohln-Nippes.

638,693. **Galosh.** J. de Noronha, Rio de Janeiro, Brazil. Represented by E. Hoffmann, Berlin.

(*Continued on page* 88)

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Nov. 28	Dec. 26	Jan. 2	Jan. 9	Jan. 16	Jan. 23
Dec.	18.54	21.57	.....	.....	.....	.....
Jan.	18.55	21.62	21.30	22.10	21.95	20.57
Mar.	18.55	21.67	21.31	22.18	22.02	20.65
July	18.55	21.30	20.90	21.92	21.77	20.55
Sept.	18.55	21.22	20.84	21.87	21.70	20.50
Dec.	.....	.....	.....	21.80	21.64	20.44
Volume per week (tons)...	6,250	11.900	19,150	16,790	11,670	12,040

New York Quotations

New York outside market rubber quotations in cents per pound

Paras	Jan. 27, 1936	Dec. 26, 1936	Jan. 27, 1937
Upriver fine	13¼	24¾	22¾
Upriver fine	*16¾	*29½	*28½
Upriver coarse ...	10¼	15	15
Upriver coarse ...	*14¾	*22	*21½
Islands fine	13½	24¼	22½
Islands fine	*17	*29	*28
Acre, Bolivian fine.	13¼	25	23¼
Acre, Bolivian fine.	*17	*30	*28½
Beni, Bolivian	13¾	25¼	23½
Madeira fine	13¼	24¾	22¾
Caucho			
Upper ball	10¼	15	15
Upper ball	*14¾	*22	*21½
Lower ball	10	14½	14
Pontianak			
Bandjermasin	6½	6	7
Pressed block	12/16	12/21	12/22
Sarawak	6½	6	7
Guayule			
Duro, washed and dried	12	16	16
Ampar	13	16½	16½
Africans			
Rio Nuñez	16	19	18
Black Kassai	16	19½	18
Prime Niger flake.	27	28½	29
Gutta Percha			
Gutta Siak	12	10½	10½
Gutta Soh	12¾	13½	14
Red Macassar	1.20	1.00	1.00
Balata			
Block, Ciudad Bolivar	32	30	30
Manaos block	32	27	26
Surinam sheets ..	36	36	35
Amber	40	39	39

*Washed and dried crepe. Shipments from Brazil.

THE accompanying table shows prices of representative future contracts on the New York market during approximately the last two months.

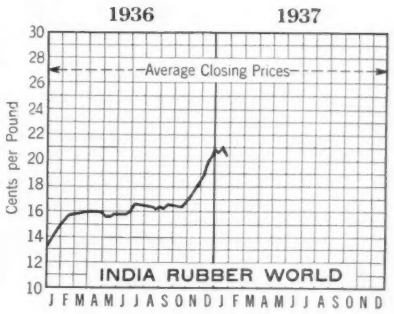
During January prices fluctuated somewhat, but in general held at the same level as at the end of December when the closing price was 21 3/16¢ although it had hit 23¼¢ on December 28. In January, ribbed smoked sheet climbed slowly to 22⅜¢ on January 11 when it settled back to 21⅞¢ on January 16, and it has since hovered around that price.

Even though the International Rubber Regulation Committee had on December 15 increased the export quota to 75% (an actual increase from 65%) for the first quarter of 1937 and to 80% for the second quarter, it took further steps early in January to relieve the stock situation and recommended that the exporting countries issue at once to the shippers coupons for the entire six months, thus permitting the shippers to ship all possible during the first three months. The committee also stated that if this policy did not relieve the situation, it would take further steps.

This it did at a meeting in London on January 26 when it fixed export quotas for the third quarter of 1937 at 85% of basic tonnage.

This action put the question of the volume of shipments possible up to the ability of the shippers to release an excess from stock or immediately increase production. Even though increased shipments would be delayed somewhat, the market felt a steadying effect from the fact that producers were immediately permitted to ship excesses as fast as they could produce and eventually there should be an increase in available stocks.

Unless the automobile strike is extended for a considerable period, the actual effect on immediate rubber consumption for tires will be of small consequence because the tire manufacturers welcome an opportunity to catch up on orders and build stock.



New York Outside Market—Spot Ribbed Smoked Sheets

Commodity Exchange, Inc., has released the following new order of its floor committee. When a member has a buying and selling market order in hand prior to the opening for execution at the opening, he may, with the approval of the floor committee and when publicly announced, cross same at a price to be fixed by the floor committee, after the opening call. Said price shall be the weighted average of the trades actually made that month during the call. If no trade occurs, a fair price shall be fixed by the floor committee. All trades so crossed shall be recorded in the record of transactions and be deemed made competitively by public outcry, and such trades designated on the ticker tape by the letters, "M.O.", immediately preceding the price, as fixed by the floor committee, at which the trade was made. The same designation will appear on the Daily Market Report after the opening call prices.

(*Continued on page* 88)

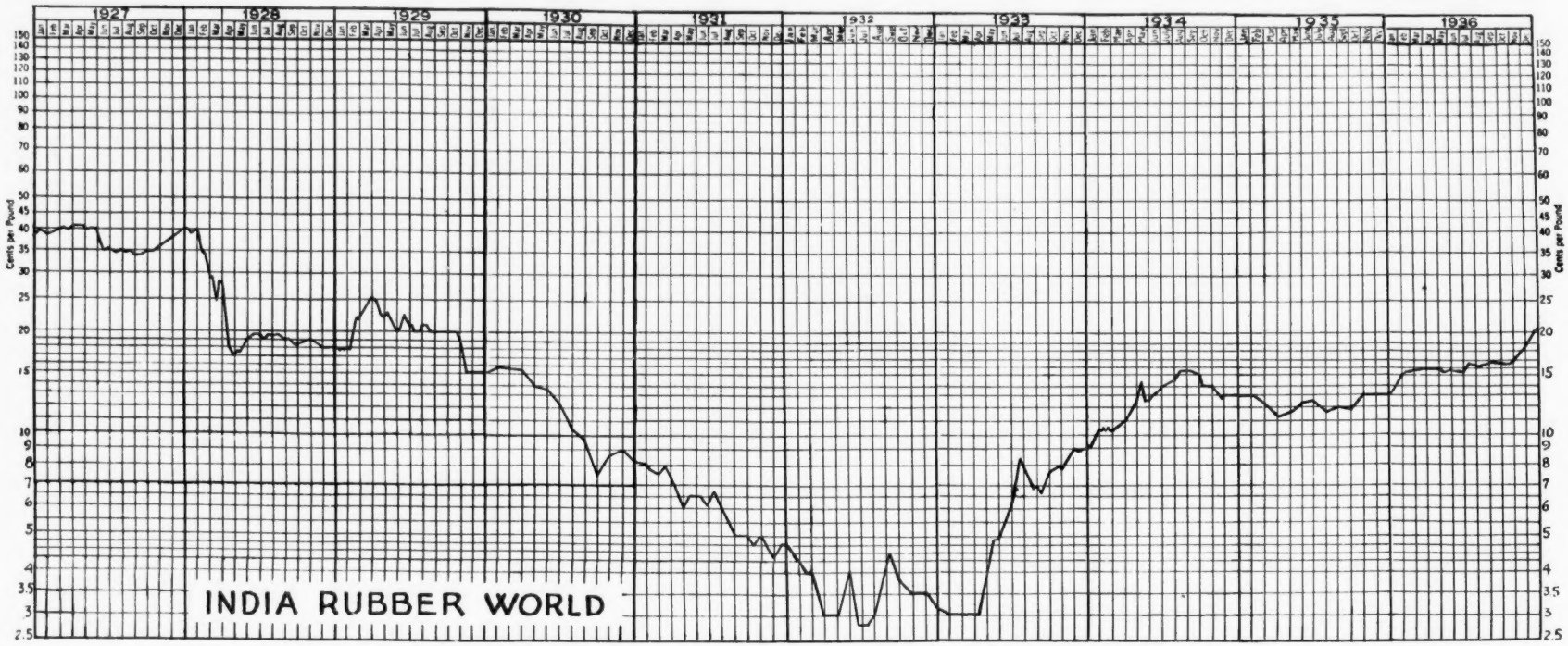
New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	December, 1936				January, 1937																	
	28	29	30	31	1*	2*	4	5	6	7	8	9	11	12	13	14	15	16	18	19	20	21	22	23
No. 1 Ribbed Smoked Sheet	23	22 3/4	21 1/4	21 7/16	..	..	20 9/16	20 3/4	21 1/16	21 1/8	21 1/8	22 1/16	22 3/4	22 1/16	22	21 1/8	21 1/8	21 7/16	21 7/16	20 1/8	21 1/16	20 1/8	20 5/8	20 5/8
No. 2 Ribbed Smoked Sheet	22 1/8	22 1/16	21 3/16	21 1/16	..	..	20 1/2	20 1/8	21 1/2	21 7/16	21 3/4	22	22 1/16	22	21 1/8	21 7/16	21 3/4	21 1/8	21 3/16	20 5/8	21 1/16	20 7/16	20 9/16	20 9/16
No. 3 Ribbed Smoked Sheet	22 1/8	22 1/16	21 3/16	21 1/16	..	..	20 1/2	20 1/8	21 1/2	21 7/16	21 3/4	22	22 1/16	22	21 1/8	21 7/16	21 3/4	21 1/8	21 3/16	20 5/8	21 1/16	20 7/16	20 9/16	20 9/16
No. 4 Ribbed Smoked Sheet	22 7/8	22 1/4	21 1/16	21 1/16	..	..	20 7/16	20 5/8	21 7/16	21 1/8	21 1/8	21 1/8	22 1/4	21 1/8	21 7/16	21 1/8	21 1/8	21 3/4	21 1/16	20 9/16	21 1/16	20 1/8	20 1/2	20 1/2
No. 1 Thin Latex Crepe...	24 1/16	23 1/2	22 3/16	22 1/16	..	..	21 1/8	21 7/16	22 1/8	23 1/16	22 1/8	23 1/16	23 1/2	23 1/16	23 1/16	23 1/16	22 1/8	23	22 1/16	21 1/8	22 1/16	22 1/16	21 3/4	21 3/4
No. 1 Thick Latex Crepe..	24 1/16	23 1/2	22 3/16	22 1/16	..	..	21 1/8	21 7/16	22 1/8	23 1/16	22 1/8	23 1/16	23 1/2	23 1/16	23 1/16	23 1/16	22 1/8	23	22 1/16	21 1/8	22 1/16	22 1/16	21 3/4	21 3/4
No. 1 Brown Crepe.....	22 1/8	22 1/16	21 1/16	21 1/16	..	..	20 1/2	20 1/8	21 1/2	21 7/16	21 3/4	22	22 1/16	22	21 1/8	21 7/16	21 3/4	21 1/8	21 3/16	20 5/8	21 1/16	20 7/16	20 9/16	20 9/16
No. 2 Brown Crepe.....	22 7/8	22 1/4	21 1/16	21 1/16	..	..	20 7/16	20 5/8	21 7/16	21 1/8	21 1/8	21 1/8	22 1/4	21 1/8	21 7/16	21 1/8	21 1/8	21 3/4	21 1/16	20 9/16	21 1/16	20 1/8	20 1/2	20 1/2
No. 2 Amber.....	22 1/8	22 1/16	21 1/16	21 1/16	..	..	20 1/2	20 1/8	21 1/2	21 7/16	21 3/4	22	22 1/16	22	21 1/8	21 7/16	21 3/4	21 1/8	21 3/16	20 5/8	21 1/16	20 7/16	20 9/16	20 9/16
No. 3 Amber.....	22 7/8	22 1/4	21 1/16	21 1/16	..	..	20 7/16	20 5/8	21 7/16	21 1/8	21 1/8	21 1/8	22 1/4	21 1/8	21 7/16	21 1/8	21 1/8	21 3/4	21 1/16	20 9/16	21 1/16	20 1/8	20 1/2	20 1/2
No. 4 Amber.....	22 3/4	22 1/16	21	20 15/16	..	..	20 7/16	20 1/2	21 1/16	21 1/16	21 1/16	21 1/16	22 1/16	21 1/16	21 3/4	21 1/16	21 1/16	21 5/16	21 1/16	20 7/16	20 15/16	20 1/16	20 5/16	20 5/16
Rolled Brown	22 1/2	21 7/8	20 3/4	20 1/16	..	..	20 1/16	20 1/4	21 1/16	21 1/16	21 1/16	21 1/16	21 7/8	21 1/16	21 1/2	21 1/16	21 1/16	21 5/8	20 15/16	20 1/16	20 15/16	20 1/16	20 7/8	20 7/8

*Holiday.

New York Outside Market—Low and High Spot Rubber Prices in Cents per Pound—1929-1935

		January	February	March	April	May	June	July	August	September	October	November	December
1930,	No. 1 thin latex crepe	15 /16⅝	15⅝/16⅞	15⅜/16¼	14⅜/15⅞	14⅜/14¾	12⅛/14¼	10⅞/12¾	10¼/10⅝	7¾/10⅛	7⅝/ 9⅜	8⅝/ 9¾	8⅝/ 9⅞
	Ribbed smoked sheet	14⅜/15¾	15 /16⅜	14⅞/15¾	14⅛/15½	13¾/14½	11¾/13¾	10⅜/12¼	9¾/10⅜	7½/ 9¾	7⅜/ 9	8¼/ 9½	8¼/ 9⅝
	Upriver fine	15¾/16⅝	16¼/17	16¾/....	15¾/16¼	15½/15¾	14¼/15¼	13¼/14⅛	13¼/....	12¼/13¼	12¼/....	12¼/12½	12¼/....
1931,	No. 1 thin latex crepe	8⅛/ 8⅞	7½/ 8¼	7⅛/ 8⅜	6 / 7⅛	6¼/ 7⅛	6⅜/ 7½	6¼/ 7¼	5⅝/ 6¼	4⅞/ 5¾	4⅞/ 5⅛	4⅝/ 5⅜	4⅝/ 5⅛
	Ribbed smoked sheet	7⅞/ 8½	7¼/ 8	6⅞/ 8⅜	5⅞/ 6⅞	6 / 6⅞	6⅛/ 7	5¾/ 6¾	5⅛/ 5¾	4⅛/ 5⅜	4½/ 5⅛	4⅜/ 5	4⅛/ 5⅛
	Upriver fine	.....	9¼/....	9 / 9⅜	8¼/ 9	8¼/ 8⅝	8⅛/ 8¼	8¼/ 8¾	7⅛/ 8⅝	6 / 7¼	6 /....	5¾/ 6¼	5½/ 5¾
1932,	No. 1 thin latex crepe	4¾/ 5⅛	4⅛/ 4⅞	4⅛/ 4⅝	3⅛/ 4¼	3⅛/ 5	3⅛/ 3⅛	3⅛/ 4	4 / 5⅛	4 / 5⅛	3⅞/ 4¼	3⅞/ 4⅛	3⅛/ 3⅛
	Ribbed smoked sheet	4⅛/ 4¾	3⅛/ 4⅛	3 / 3⅝	2⅛/ 3⅛	2¾/ 4⅛	2⅜/ 2¼	2⅜/ 3⅛	3⅛/ 4½	3⅛/ 4⅛	3⅛/ 3⅛	3⅛/ 3⅛	3⅛/ 3⅜
	Upriver fine	5½/ 5¾	5¼/ 5½	5 / 5¼	5 / 5¼	5½/ 5¾	5½/....	5½/ 5¾	5¾/ 7½	6½/ 7¾	7¼/ 7¾	7¼/ 7½	6½/ 7½
1933,	No. 1 thin latex crepe	3⅝/ 3⅞	3⅝/ 3⅛	3⅝/ 3⅞	3¾/ 5	5⅛/ 6⅞	5⅞/ 7⅛	7⅜/10½	7½/ 8¾	7½/ 9⅛	7¾/ 8⅞	8½/10⅛	9⅜/10½
	Ribbed smoked sheet	2⅛/ 3¼	2⅞/ 3	2⅛/ 3⅛	2⅛/ 4¼	4⅛/ 6⅛	5¼/ 6⅛	6½/ 9¾	6⅝/ 7⅞	6⅝/ 8¼	6¾/ 8	7¾/ 9⅛	8½/ 9⅛
	Upriver fine	6 / 6¼	6 /....	6 /....	6 / 6½	6¼/ 8¼	7½/ 8½	8¼/11	9¾/11	8¾/ 9¾	8 / 9¼	8 / 9	9 /....
1934,	No. 1 thin latex crepe	10¼/11¾	11¼/12¼	11⅞/13¼	13⅛/15¾	14 /17⅛	14¾/16	15⅞/16⅝	16¼/17⅛	15¾/16¾	13¾/15½	13⅜/14½	13¼/13⅞
	No. 1 ribbed smoked sheet	8¾/10⅜	9⅛/10¾	10⅛/11⅝	11¼/13⅝	12 /15¼	12¾/14⅛	13⅛/14⅞	14⅛/15¾	14¾/15⅞	13 /14½	12⅞/13⅜	12¾/13⅛
	Upriver fine	8¾/ 9	9 / 9¾	9¾/10¼	10¼/11	11 /13¼	11 /12	11¼/12	11½/11¾	10¾/11¾	10 /10¾	9¾/10	9¼/ 9¾
1935,	No. 1 thin latex crepe	12¾/14⅛	13 /13¾	10⅝/12⅞	10⅞/12¼	11⅝/13	12½/13⅛	11⅛/12¾	11⅛/12⅜	11⅝/12¼	12 /13¼	13⅛/13⅛	13⅛/13⅛
	No. 1 ribbed smoked sheet	12⅜/13⅛	12⅞/13⅜	10⅜/12⅞	10⅛/12	11⅜/12¾	12⅞/12⅛	11¾/12⅞	11⅛/12⅛	11¾/12	11¾/13½	12⅛/13⅛	12¾/13⅞
	Upriver fine	9¼/ 9¾	9½/ 9¾	9 / 9½	8¾/ 9½	9¼/ 9½	9½/10½	9¾/10	9¾/10¼	9¾/10⅝	10½/12¼	12 /13½	12 /13½
1936,	No. 1 thin latex crepe	13⅞/15⅞	15⅞/16⅛	16⅛/16⅛	16⅞/16⅞	15⅝/16⅛	15⅛/16½	16½/17⅞	16⅛/16⅛	16⅜/17¼	16⅛/17⅛	17¾/19⅜	19¼/24⅛
	No. 1 ribbed smoked sheet	13½/15⅛	15⅛/15¾	15⅝/16⅛	15⅛/16⅝	15⅝/15⅛	15⅝/16⅞	16⅞/16⅛	16⅝/16½	16¼/16⅝	16⅛/17⅛	17⅛/18⅞	18½/23
	Upriver fine	12 /13	13 /16½	15¾/16¾	16¾/18¾	17½/18½	17¼/17½	17½/17⅞	17⅞/20½	20½/21	20½/21½	21½/23¾	23½/25¼



New York Outside Market—Closing Prices Ribbed Smoked Sheets—1927-1936

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Nov. 28	Dec. 26	Jan. 2	Jan. 9	Jan. 16	Jan. 23
Dec.	11.91	.....	.....	.....	.....	.....
Jan.	11.77	12.40	12.44	12.39	.....	.....
Mar.	11.74	12.39	12.40	12.46	12.47	12.47
July	11.50	12.24	12.21	12.26	12.27	12.18
Sept.	11.30	12.02	11.97	12.00	12.01	11.90
Dec.	.....	.....	11.88	11.86	11.91	11.78

THE accompanying table gives the general trend of representative cotton futures for approximately the last two months. Spot middlings at 13.04¢ on December 31 fell off to 12.91¢ on January 5, hovered under 13.08¢ as a peak on January 18, and then fell off to 12.95¢ on January 21. Activity has been very slow with little variation in price. However, there has been considerable agitation as to the extent of governmental future releases.

The government released in 1936 1,400,000 bales of cotton held as collateral for 11¢ and 12¢ loans to producers, but it still holds approximately 3,000,000 bales of 11¢ and 12¢ loan cotton. The Commodity Credit Corp. announced early in January that because of a prospective tight demand situation early in 1937 it would dispose of a reasonable amount of the 11¢ and 12¢ loan. cotton. Secretary Wallace of the Agriculture Department announced that the program would start February 1 and extend through April 1. Officials refused to comment on the amount to be sold, but indicated an amount equal to what the market could absorb and stated definitely that this move was not a liquidation step, but a means to protect the market and demand.

Under terms of release the producers are given the right to repossess their loan cotton at 25 points less than the average price of middling ⅞-inch, provided the average price for the cotton at the ten designated spot markets is not less than 12.75¢ a pound. To guard against cotton being retained in the warehouses and kept from normal channels of trade, the Commodity Credit Corp. served notice on the warehousemen that the C.C.C. will not pay any charges on the cotton if the warehouseman purchases the producer's equity and does not obtain release of the cotton within the required time, which is expected to be ten days according to the reported intention of the C.C.C.

Practically all the 1936 crop of domestic cotton has been absorbed, and the 3,000,000 bales held by the government appears to be the only available supply.

John C. Botts, president of the New York Cotton Exchange, recently disclosed that the world has consumed cotton at a faster rate during the past 12 months than during any previous 12 months in history. This record is remarkable in view of the large increase in the production of synthetic fibers and the continuing large amount of industrial unemployment in various countries.

Domestic cotton shows a decreased percentage of the world production, and although 1936 production was higher than 1935, it was far below the average of predepression years.

Fabrics

Owing to the recent stormy weather raincoat manufacturers are selling more coats today than they ever have at this time of year. All concerns also now have their spring lines ready and are open for business.

The sheetings market turned very active the first of the year, and buyers covered additional requirements through the second quarter and well into the third. Prices have stiffened, particularly for deliveries between now and September, and unless unforeseen circumstances arise, the trade looks for a continued good market, certainly through the first half of 1937. The automobile strike is, of course, disquieting, but it has not as yet caused requests for deferments of any proportion.

New York Quotations

January 27, 1937

Drills		
38-inch 2.00-yard	yd.	..
40-inch 3.47-yard		..
50-inch 1.52-yard		..
52-inch 1.85-yard		..
52-inch 1.90-yard		$0.18⅜
52-inch 2.20-yard		.16¾
52-inch 2.50-yard		.14¾
59-inch 1.85-yard		.18⅞
Ducks		
38-inch 2.00-yard D. F.	yd.	.15½
40-inch 1.45-yard S. F.		..
51½-inch 1.35-yard D. F.		.22¼
72-inch 1.05-yard D. F.		.31½
72-inch 17.21-ounce		..
MECHANICALS		
Hose and belting	lb.	..
TENNIS		
52-inch 1.35-yard	yd.	..
Hollands		
GOLD SEAL		
20-inch No. 72	yd.	.11
30-inch No. 72		.20
40-inch No. 72		.22
RED SEAL		
20-inch	yd.	.09⅝
30-inch		.18
40-inch		.19¼
50-inch		.27
Osnaburgs		
40-inch 2.34-yard	yd.	.12⅜
40-inch 2.48-yard		.11¾
40-inch 2.56-yard		.11¼
40-inch 3.00-yard		..
40-inch 7-ounce part waste		..
40-inch 10-ounce part waste		..
37-inch 2.42-yard		..
Raincoat Fabrics		
COTTON		
Bombazine 60 x 64	yd.	.11¼
Plaids 60 x 48		.13½
Surface prints 60 x 64		.14½
Print cloth, 38½-inch, 60 x 64		.08¼
SHEETINGS, 40-INCH		
48 x 48, 2.50-yard	yd.	.12
64 x 68, 3.15-yard		.11¾
56 x 60, 3.60-yard		.10
44 x 40, 4.25-yard		.07⅞
SHEETINGS, 36-INCH		
48 x 48, 5.00-yard	yd.	.07⅜
44 x 40, 6.15-yard		.06½
Tire Fabrics		
BUILDER		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.32½
CHAFER		
14 ounce 60" 20/8 ply Karded peeler	lb.	.30½
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.31½
CORD FABRICS		
23/5/3 Karded peeler, 1 1/32" cotton	lb.	.32
15/3/3 Karded peeler, 1 1/32" cotton	lb.	.30
23/5/3 Karded peeler, 1¼" cotton	lb.	.36
23/5/3 Combed Egyptian	lb.	.48
LENO BREAKER		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.32

New Accelerator

B-J-F, specially suitable for use in tire compounds is an aldehyde amine derivative of mercaptobenzothiazole, said to possess all the advantages of the straight thiazoles, plus a reduction of the extreme persistence in curing associated with these accelerators. Service tests involving hundreds of tires show this accelerator produces tire treads of unusual resistance to abrasion and flex cracking. B-J-F, the supplier claims, is easy to handle and secure and is economical to use.

RUBBER SCRAP

DURING January the demand for all grades of rubber scrap continued very active, with the market still advancing strongly, on most of the grades, especially inner tubes, tires, and certain types of mechanicals. General business continues to be very good, with a consequent heavy consumption of scrap.

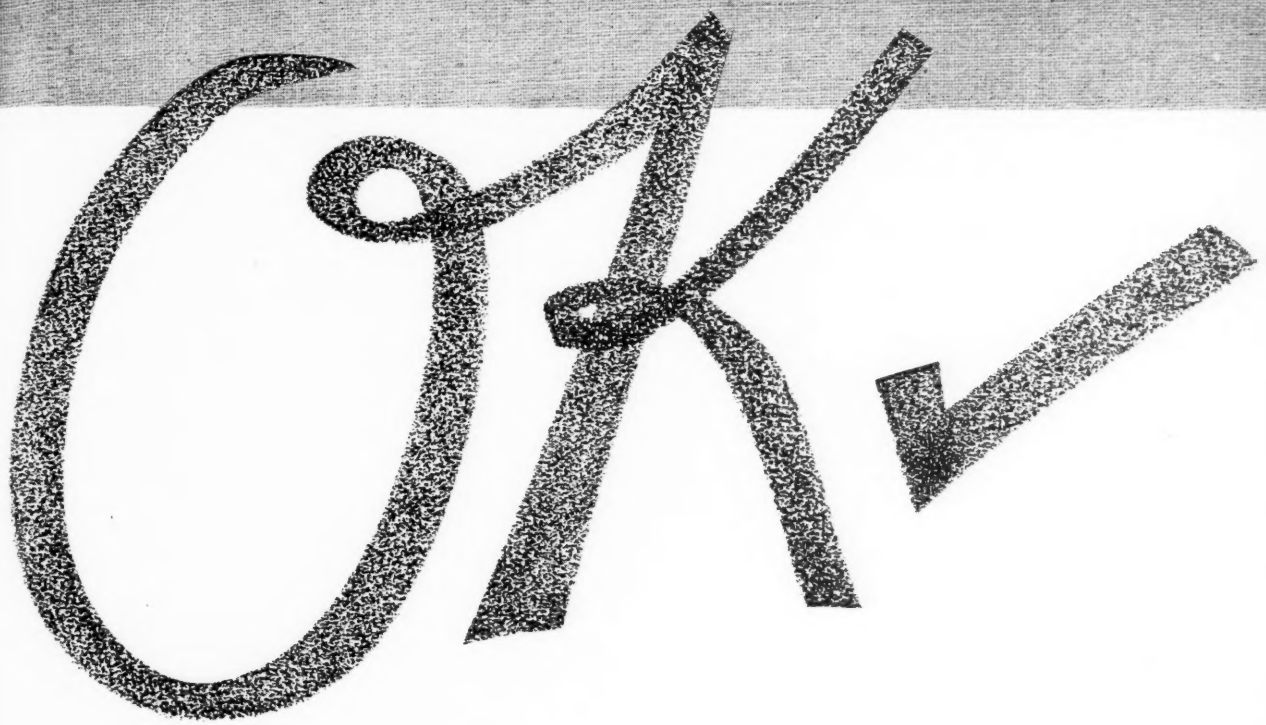
CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

January 27, 1937

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01¼/$0.01⅜
Colored	lb.	.00⅞/ .01
Untrimmed arctics	lb.	.00⅞/ .01
Inner Tubes		
No. 1, floating	lb.	.12½/ .13½
No. 2, compound	lb.	.05⅜/ .05¾
Red	lb.	.05½/ .05⅞
Mixed tubes	lb.	.05¼/ .05⅝
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	13.50 /14.50
Beadless	ton	18.75 /19.75
Auto tire carcass	ton	24.00 /26.00
Black auto peelings	ton	18.75 /19.75
Solid		
Clean mixed truck	ton	31.50 /33.00
Light gravity	ton	36.00 /37.00
Mechanicals		
Mixed black scrap	ton	25.00 /30.00
Hose, air brake	ton	31.00 /33.00
Garden, rubber covered	ton	16.50 /18.00
Steam and water, soft	ton	16.50 /18.00
No. 1 red	lb.	.03½/ .03⅞
No. 2 red	lb.	.02¾/ .03
White druggists' sundries	lb.	.04½/ .05
Mechanical	lb.	.03¾/ .04
Hard Rubber		
No. 1 hard rubber	lb.	.14½/ .15½

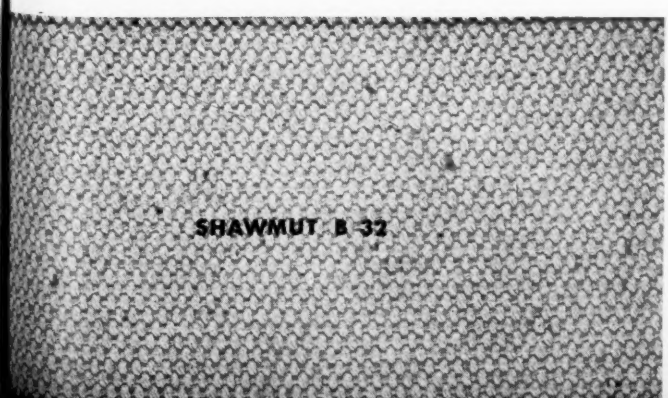
COLUMBUS SHEETING—40" 4.02 60 x 52

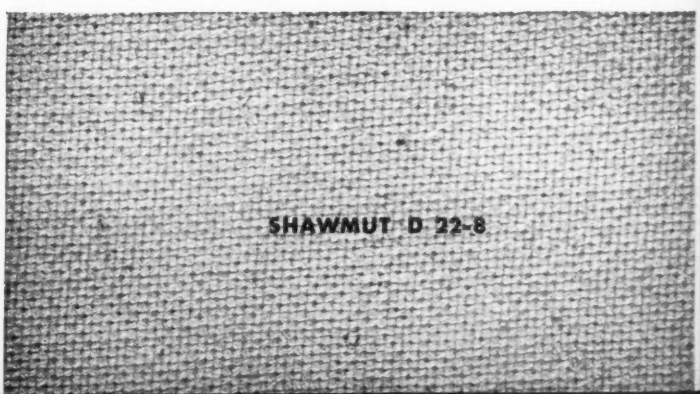


Cotton fabrics that run true to specification

More often than not, fabrics used in the rubber industries must meet detailed specifications exactly. It is for this reason that we are particularly proud of our big volume of business in the rubber industries. The technical skill of our textile experts and the completeness of our up-to-date laboratories enable us to say with confidence that we are in a position to furnish cotton fabrics that will run true to your specifications. Frequently, our facilities have provided valuable assistance in the development of new fabrics to meet special requirements. We would appreciate an opportunity to demonstrate our ability to help you solve problems connected with the use of cotton fabrics.

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK, N. Y.





RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption % to Crude	U. S. Stocks*	Exports
1934	110,010	100,597	22.3	23,079	4,737
1935	122,140	113,530	22.9	25,069	5,383
1936					
January	11,665	10,039	20.7	26,145	572
February	10,188	7,366	20.0	28,267	455
March	10,712	8,767	20.5	29,161	591
April	11,382	10,333	19.9	22,274	589
May	11,512	10,398	20.6	22,852	635
June	11,935	11,547	21.9	22,738	596
July	12,330	11,816	24.6	22,602	633
August	12,856	10,993	23.6	23,750	617
September	12,959	11,170	24.1	24,950	582
October	14,737	12,606	25.5	26,389	592
November	14,357	12,029	23.9	28,135	511
December	15,938	12,984	26.2	30,573	...

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

BOTH the production and the consumption of reclaimed rubber increased sharply during January, the production showing an approximate gain of 11.1% and consumption 7.7% as compared with the December figures. The immediate outlook in the reclaim market is distinctly encouraging; the demand is well sustained in most lines. While the automobile strike may have some effect on the future of the market, there has been no indication of any reaction up to date; the firms supplying automotive goods apparently are continuing their usual schedules.

The demand for insulation and mechanical goods in general remains unabated, and the demand for tire and tube manufactures is still maintained on a basis reflecting the substantial consumption of crude rubber at present higher levels.

January saw varying price advances in tire and shoe reclaims as well as in special blends, including white reclaim. It is expected that these advances will continue for a period at least.

The consumption of reclaimed rubber in 1936 is estimated to be 130,048 long tons as compared with 113,074 (revised) long tons for 1935, a gain of 8.7%; while the production for the year was 150,571 long tons, compared with 118,484 long tons produced in 1935, an increase of some 27%.

New York Quotations

January 27, 1937

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	5¾/ 6
Acid	1.18-1.22	6¾/ 7
Shoe		
Standard	1.56-1.60	6¾/ 7
Tube		
No. 1 Floating	1.00	19 /19¼
Compounded	1.10-1.12	8¾/ 9
Red Tube	1.15-1.30	8¾/ 9¼
Miscellaneous		
Mechanical Blends	1.25-1.50	4¼/ 4¾
White	1.35-1.50	14 /14½

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

IMPORTS, CONSUMPTION, AND STOCKS

CRUDE rubber consumption by United States manufacturers for 1936 is estimated at 573,522 long tons, compared with 491,544 (revised) long tons in 1935, according to R.M.A. statistics.

December consumption is estimated at 49,626 long tons, against 50,303 long tons for November, 1936, and 42,474 long tons for December, 1935.

Crude rubber imports for 1936 were 490,858 long tons, against 448,116 long tons in 1935. December, 1936, crude rubber imports totaled 57,049 long tons, compared with 44,296 long tons for November and 34,596 long tons for December, 1935.

The estimated total domestic stocks of crude rubber on hand December 31 were 218,844 long tons, against 212,515 long tons on hand November 30 and 303,000 long tons on hand December 31, 1935.

Crude rubber afloat to United States ports on December 31 is estimated at 56,567 long tons, compared with 73,691 long tons afloat November 30 and 39,094 long tons afloat December 31, 1935.

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption Tons	U. S. Stocks Mfgrs., Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.—Public Warehouses, London, Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡‖ Tons
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,019,200	944,141	729,391
1935	448,116	491,544	303,000	39,094	164,295	28,304	872,722	942,924	634,196
1936									
January	31,292	48,506	285,054	43,870	162,107	31,195	62,726	83,993	569,826
February	35,219	36,746	282,902	46,532	157,028	38,421	64,019	68,635	572,323
March	37,451	42,703	276,823	58,935	147,712	29,322	69,252	80,132	590,475
April	40,370	51,897	264,228	47,678	140,404	32,200	60,030	85,336	527,178
May	35,598	50,482	248,317	48,860	130,590	26,687	68 837	90,090	501,582
June	41,835	52,636	245,886	47,228	122,285	28,260	66,478	87,830	532,992
July	35,881	48,127	234,498	60,343	113,386	29,493	83,850	86,698	490,074
August	42,563	46,657	229,056	63,597	108,215	28,289	71,213	81,379	468,238
September	48,386	46,330	228,477	62,240	103,962	26,936	72,314	82,288	490,961
October	40,920	49,509	219,553	67,825	96,625	24,593	81,687	91,509	448,560
November	44,296	50,303	212,515	73,691	88,781	26,761	78,633	87,505	437,069
December	57,049	49,626	218,844	56,567	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. ‖Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, and afloat.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
Jan. 2	33,076	45,407
Jan. 9	31,792	44,709
Jan. 16	30,962	43,697
Jan. 23	29,671	43,388

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for December, 1936: Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	2,245	438
United States	20,857	548
Continent of Europe	5,170	432
British possessions	1,318	18
Japan	6,575	54
Other countries	1,088	6
Totals	37,253	1,496

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	4,868	576
Dutch Borneo	1,119	4
Java and other Dutch islands	104	..
Sarawak	6	..
British Borneo	124	6
Burma	330	10
Siam	1,861	251
French Indo-China	36	350
Other countries	103	10
Totals	8,551	1,207

COMPOUNDING INGREDIENTS

UNLESS the automobile strike continues too long, tire manufacturers expect to maintain usual consumption.

CARBON BLACK. Consumption is continuing on a large scale, and present releases for shipment in the next few weeks indicate a steady consumption is in prospect. Industry stocks have been reduced to a nominal basis, but large additional production capacity is being created by important factors in the industry. Prices are unchanged over December, and no increase in price is expected in the near future, even though consumption remains at a high rate.

FACTICE. The demand for factice and rubber substitutes is reported fair. As predicted in the January review, federal taxes on many vegetable oils are now making themselves felt as January reflected an increase of ½¢ per pound, and somewhat higher prices may still be expected.

LITHARGE. During December there were three price advances, the last of which was ½¢ per pound on December 21. Since then prices have remained the same. Early in January the automobile strike curtailed battery production and had a retarding effect on lead compounds.

LITHOPONE. The demand is slow, with a fair daily call at the same prices as last reported.

RUBBER CHEMICALS. Very little, if any, price change is expected soon on accelerators and antioxidants. Some special chemicals may show increased prices because of raw materials, but the general level is expected to remain about as at present. The demand has been greater the last quarter of 1936 and still holds up, but the supply appears adequate.

RUBBER COLORS. On some items the market is extremely firm, and on others a slow demand is reported. Prices remain the same, but indications are that some coloring ingredients may carry some price advances in the spring.

RUBBER SOLVENTS. Prices are unchanged, and the demand in general is lively although the requirements of tire manufacturers will eventually be affected by the automobile situation.

STEARIC ACID. Two increases of ½¢ per pound each occurred during the month, and the demand was quite active.

TITANIUM PIGMENTS. Prices remained steady at the schedules. Demands continued heavy from what was probably another record year for the consumption of titanium pigment. The market opened firm in 1937, and there has been a sustained interest among customers, especially in the paint industry.

ZINC OXIDE. The price remained unchanged. The actual demand has been moderate, but there is increased inquiry indicating that some consumers have well depleted their stocks purchased prior to the price rise last October.

New York Quotations

January 27, 1937

Prices Not Reported Will Be Supplied on Application

Abrasives		
Pumicestone, powdered	lb.	$0.02½/$0.03½
Rottenstone, domestic	lb.	.03 / .03½
Silica, 15	ton	38.00
Accelerators, Inorganic		
Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.08½
Accelerators, Organic		
A-1	lb.	.24 / .28
A-5-10	lb.	.33 / .36
A-10	lb.	
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
A-77	lb.	.46 / .55
Accelerator 49	lb.	.42
808	lb.	
833	lb.	
Acrin	lb.	
Aldehyde ammonia	lb.	
Altax	lb.	
B-J-F	lb.	
Beutene	lb.	
Butyl Zimate	lb.	
C-P-B	lb.	
Captax	lb.	
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	
Di-Esterex	lb.	
Di-Esterex-N	lb.	
DOTG	lb.	.47
D.O.T.T.U.	lb.	
DPG	lb.	.37 / .65
El-Sixty	lb.	
Ethylideneaniline	lb.	
Formaldehyde P.A.C.	lb.	
Formaldehydeaniline	lb.	
Formaldehyde-para-toluidine	lb.	
Guantal	lb.	.42 / .51
Hepteen	lb.	
Base	lb.	
Hexamethylenetetramine	lb.	
Lead oleate, No. 999	lb.	.12
Witco	lb.	.13
Methylenedianilide	lb.	
Monex	lb.	
Novex	lb.	
O. N. V.	lb.	
Ovac	lb.	
Pipsolene	lb.	1.60 / 1.85
R-2	lb.	1.50 / 1.80
Base	lb.	3.30 / 3.75
R & H 50-D	lb.	
Safex	lb.	
Super-sulphur No. 1	lb.	
No. 2	lb.	
Tetrone A	lb.	
Thiocarbanilide	lb.	
Thionex	lb.	
Trimene	lb.	
Base	lb.	
Triphenyl guanidine (TPG)	lb.	
Tuads	lb.	
Ureka	lb.	$0.62 /$1.00
Blend B	lb.	.62 / .75
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
Z-B-X	lb.	
Z-88-P	lb.	.48 / .60
Zenite	lb.	
A	lb.	
B	lb.	
Zimate	lb.	
ZML	lb.	
Activator		
Barak	lb.	
Age Resisters		
AgeRite Alba	lb.	
Exel	lb.	
Gel	lb.	
Hipar	lb.	
HP	lb.	
Powder	lb.	
Resin	lb.	
D	lb.	
Syrup	lb.	
White	lb.	
Akroflex C	lb.	
Albasan	lb.	
Antox	lb.	
B-L-E	lb.	
B-X-A	lb.	
Copper Inhibitor X-872	lb.	
Flectol B	lb.	.54 / .65
H	lb.	.54 / .65
White	lb.	.95 / 1.15
M-U-F	lb.	
Neozone (standard)	lb.	
A	lb.	
C	lb.	
D	lb.	
E	lb.	
Oxynone	lb.	.66 / .75
Parazone	lb.	
Perflectol	lb.	.67 / .75
Permalux	lb.	
Santoflex A	lb.	
Solux	lb.	
Thermoflex	lb.	
A	lb.	
V-G-B	lb.	
Alkalies		
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	3.00 / 4.00
liquid, 50%	100 lbs.	2.25
solid (700 lb. drums)	100 lbs.	2.60 / 3.00
Antiscorch Materials		
Antiscorch T	lb.	
Cumar RH	lb.	$0.09
Retarder B	lb.	
W	lb.	
T-J-B	lb.	
U.T.B.	lb.	
Antisun Materials		
Heliozone	lb.	
Sunproof	lb.	
Brake Lining Saturant		
B. R. T. No. 3	lb.	.0165//$0.0175
Colors		
BLACK		
Lampblack (commercial)	lb.	.15
BLUE		
Brilliant	lb.	
Prussian	lb.	.37½
Toners	lb.	.80 / 3.50
BROWN		
Mapico	lb.	.13
GREEN		
Brilliant	lb.	
Chrome, light	lb.	
medium	lb.	
oxide	lb.	.20
Dark	lb.	
Guignet's	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.50
ORANGE		
Lake	lb.	
Toners	lb.	.40 / 1.60
ORCHID		
Toners	lb.	1.50 / 2.00
PINK		
Toners	lb.	1.50 / 4.00
PURPLE		
Permanent	lb.	
Toners	lb.	.60 / 2.00
RED		
Antimony		
Crimson, 15/17%	lb.	.50
R. M. P. No. 3	lb.	.46
Sulphur free	lb.	.48 / .52
Golden 15/17%	lb.	.28
7-A	lb.	.35
Z-2	lb.	.22
Aristi	lb.	1.75
Cadmium, light (400 lb. bbls.)	lb.	.70
Chinese	lb.	
Crimson	lb.	
Mapico	lb.	.09¼
Medium	lb.	
Rub-Er-Red	lb.	.09¼

Scarlet ..... lb.
Toners ..... lb. $0.80 /$2.00

WHITE

Lithopone (bags) ..... lb. .04¼/ .04½
Albalith Black Label-11.. lb. .04¼/ .04½
Astrolith (5-ton lots).... lb. .04¼
Azolith ..... lb. .04¼/ .04½
Cryptone-19 ..... lb. .05¾/ .06
CB-21 ..... lb. .05¾/ .06
ZS No. 20..... lb. .09 / .09¼
No. 86 ..... lb. .09 / .09¼
Sunolith (5-ton lots)..... lb. .04¼
Ray-Bar ..... lb.
Ray-Cal ..... lb.
Rayox ..... lb.
Titanolith (5-ton lots) .... lb. .05¾
Titanox-A (50-lb. bags).... lb. .16 / .16¾
B (50-lb. bags) ..... lb. .05¾/ .06
B-30 (50-lb. bags)..... lb. .05¾/ .06
C (50-lb. bags) ..... lb. .05¾/ .06
Ti-Tone ..... lb.
Zinc Oxide
Anaconda, Green Seal
No. 333..... lb. .06¼/ .06½
Lead Free No. 352.... lb. .05¼/ .05½
No. 570 ..... lb. .05¼/ .05½
No. 577 ..... lb. .05¼/ .05½
Red Seal No. 222..... lb. .05¾/ .06
U.S.P. No. 777 (bbls.) lb. .08
White Seal No. 555.... lb. .06¾/ .07
Axo ZZZ-11 ..... lb. .05¼/ .05½
44 ..... lb. .05¼/ .05½
55 ..... lb. .05¼/ .05½
66 ..... lb. .05¼/ .05½
French Process, Florence
White Seal-7 (bbls.). lb. .06¾/ .07
Green Seal-8 ..... lb. .06¼/ .06½
Red Seal-9 ..... lb. .05¾/ .06
Kadox, Black Label-15.. lb. .05¼/ .05½
Blue Label-16..... lb. .05¼/ .05½
Red Label-17 ..... lb. .05¼/ .05½
Horse Head Special 3.... lb. .05¼/ .05½
XX Red-4 ..... lb. .05¼/ .05½
23 ..... lb. .05¼/ .05½
72 ..... lb. .05¼/ .05½
78 ..... lb. .05¼/ .05½
80 ..... lb. .05¼/ .05½
103 ..... lb. .05¼/ .05½
110 ..... lb. .05¼/ .05½
St. Joe (lead free)
Black Label ..... lb. .05¼/ .05½
Green Label ..... lb. .05¼/ .05½
Red Label ..... lb. .05¼/ .05½
U.S.P. X..... lb. .08 / .08¼
White Jack ..... lb. .09 / .09¼

YELLOW

Cadmolith (cadmium yellow), 400 lb. bbls. ..... lb. .45
Lemon ..... lb.
Mapico ..... lb. .09½
Toners ..... lb. 2.50

Dispersing Agents

Bardol ..... lb. .0215/ .024
Darvan ..... lb.

Factice

Amberex ..... lb. .23
Brown ..... lb. .09 / .14
Neophax A ..... lb. .13
B ..... lb. .13
Fac-Cel B ..... lb. .15
C ..... lb. .16
White ..... lb. .09 / .16

Fillers, Inert

Asbestine, c.l., f.o.b. mills. ton 15.00
Barytes ..... ton 30.00
f.o.b. St. Louis (50 lb. paper bags)..... ton 22.85
off color, domestic..... ton 20.00 /25.00
white, imported ..... ton 29.00 /32.00
Blanc fixe, dry, precip..... lb. .03½/ .05
Calcene ..... ton 37.50 /45.00
Infusorial earth ..... lb. .02 / .03
Kalite No. 1..... ton
No. 3 ..... ton
Magnesia, calcined, heavy.. lb. .04
carbonate ..... lb. .06½/ .07½
Pyrax ..... ton
Whiting
Columbia Filler ..... ton 9.00 /14.00
Domestic ..... 100 lbs.
Guilders ..... 100 lbs.
Hakuenka ..... lb.
Paris white, English cliff-stone ..... 100 lbs.
Southwark Brand, Commercial ..... 100 lbs.
All other grades.. 100 lbs.
Suprex, white extra light. ton 45.40 /60.00
heavy ..... ton 45.40 /60.00
Witco, c.l. ..... ton 7.00

Fillers for Pliability

P-33 ..... lb.
Thermax ..... lb.
Velvetex ..... lb. .03 / .04½

Finishes

IVCO lacquer, clear..... gal. 1.00 / 2.25
colors ..... gal. 2.85 / 3.25
Rubber lacquer, clear..... gal.
colored ..... gal.
Starch, corn, pwd..... 100 lbs.
potato ..... lb.
Talc ..... ton 25.00 /45.00

Flock

Cotton flock, dark ..... lb. $0.11½/$0.14
dyed ..... lb. .50
white ..... lb. .14½/ .20
Rayon flock, colored..... lb. 1.25 / 1.60
white ..... lb. 1.10

Latex Compounding Ingredients

Accelerator 85 ..... lb.
89 ..... lb.
122 ..... lb.
552 ..... lb.
Alphasol-OS ..... lb. .60
Antox, Dispersed ..... lb.
Aquarex A ..... lb.
D ..... lb.
F ..... lb.
Aresklene 375 ..... lb. .35 / .50
Black No. 25, Dispersed.... lb. .22 / .40
Catalpo ..... ton
Color Pastes, Dispersed.... lb.
Dispersex No. 15..... lb. .80 / .95
No. 20 ..... lb. .60 / .75
Emo, brown ..... lb. .15
white ..... lb. .15
Factice Compound, Dispersed ..... lb. .36
Heliozone, Dispersed ..... lb.
Igepon A..... lb.
MICRONEX, Colloidal .... lb. .06 / .07
Nekal BX (dry) ..... lb.
Palmol ..... lb. .12
Paradora ..... lb.
Stablex A ..... lb. 1.75
B ..... lb. .90
C ..... lb. .30
Sulphur, Dispersed ..... lb. .10 / .15
No. 2 ..... lb.
T.1. (400 lb. drums)..... lb. .40
Tepidone ..... lb.
Vulcan Colors ..... lb.
Zinc oxide, Colloidal ..... lb.
Dispersed ..... lb. .09 / .15

Mineral Rubber

B. R. C. No. 20..... lb. .009 / .01
Black Diamond ..... ton 25.00
Genasco Hydrocarbon, granulated, (fact'y)... ton
solid ..... ton
Gilsonite Hydrocarbon (factory) ..... ton
Hydrocarbon, hard ..... ton
soft ..... ton
Parmr Grade 1..... ton 25.00
Grade 2 ..... ton 25.00
Pioneer ..... ton
265° ..... ton

Mold Lubricants

Mold Paste ..... lb. .12 / .30
Sericite ..... ton 65.00 /75.00
Soapbark ..... lb.
Soapstone ..... ton 25.00 /35.00

Oil Resistant

AXF ..... lb.

Reclaiming Oils

B. R. V..... lb. .03 / .0325
S. R. O. ..... lb. .0175/ .0185

Reenforcers

Carbon Black
Aerfloted Arrow Specification Black ..... lb. .0535/ .0825
Arrow Compact Granulized Carbon Black ..... lb.
"Certified" Heavy Compressed, Cabot ..... lb.
Spheron ..... lb.
Disperso (delivered) .... lb. .0445/ .0535
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .0445
c.l., delivered New York. lb. .0535
local stock, bags, delivered ..... lb. .07½
Dixiedensed, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .0445
c.l., delivered New York. lb. .0535
local stock, bags, delivered ..... lb. .07½
Dixiedensed 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ..... lb. .0445
c.l., delivered New York. lb. .0535
local stock, bags, delivered ..... lb. .07½
Excello, c.l., f.o.b. Gulf ports ..... lb. .0445/ .0645
delivered New York. lb. .0535/ .0735
l.c.l., delivered New York ..... lb. .07 / .08¼
Fumonex, c.l., f.o.b. works. lb. .03
ex-warehouse ..... lb. .04½
Gastex ..... lb. .03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .0445
c.l., delivered New York. lb. .0535
local stock, bags, delivered ..... lb. .07½
Kosmobile 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ..... lb. $0.0445
c.l., delivered New York. lb. .0535
local stock, bags, delivered ..... lb. .07½
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .0445
c.l., delivered New York. lb. .0535
local stock, bags, delivered ..... lb. .07½
MICRONEX Beads, c.l., f.o.b. Gulf ports... lb. .0445
c.l., delivered New York ..... lb. .0535
local, stock, bags, delivered ..... lb. .07½
Mark II, c.l., f.o.b. Gulf ports..... lb. .0445
c.l., delivered New York ..... lb. .0535
local, stock, bags, delivered ..... lb. .07½
Standard, c.l., f.o.b. Gulf ports..... lb. .0445
c.l., delivered New York ..... lb. .0535
local, stock, bags, delivered ..... lb. .07½
W-5, c.l., f.o.b., Gulf ports ..... lb. .0445
c.l., delivered New York ..... lb. .0535
local stock, bags, delivered ..... lb. .07½
W-6, c.l., f.o.b., Gulf ports ..... lb. .0445
c.l., delivered New York ..... lb. .0535
local stock, bags, delivered ..... lb. .07½
Pelletex ..... lb. .03 /$0.07
Supreme, c.l., f.o.b. Gulf ports ..... lb. .0445/ .0645
delivered New York. lb. .0535/ .0735
l.c.l., delivered New York ..... lb. .07 / .08¼
"WYEX BLACK" ..... lb.
Carbonex ..... lb. .029 / .0315
Carbonex "S" ..... lb. .0315/ .034
Clays
Aerfloted Paragon (bulk) ton 6.50
Suprex No. 1 Selected. ton 10.00
No. 2 Standard..... ton 9.00
China ..... ton 17.50 /20.00
Dixie ..... ton
Junior ..... ton
McNamee ..... ton
Par ..... ton
Witco ..... ton 9.00
Cumar EX ..... lb. .035

Reodorants

Amora A ..... lb.
B ..... lb.
C ..... lb.
D ..... lb.
Paradors ..... lb.
Rodo No. 0..... lb.
No. 10 ..... lb.

Rubber Substitutes

Black ..... lb. .07½/ .11
Brown ..... lb. .08½/ .14
White ..... lb. .09 / .15

Softeners

Burgundy pitch ..... lb. .06
Cycline oil ..... gal. .15 / .28
Palm oil (Witco)..... lb. .07
Pine tar ..... gal.
Plastogen ..... lb.
Reogen ..... lb.
Rosin oil, compounded.... gal. .40
RPA No. 1..... lb.
Rubtack ..... lb. .10
Tackol ..... lb. .085 / .18
Tonox ..... lb.
Powder ..... lb.
Witco No. 20 ..... gal. .18

Softeners for Hard Rubber Compounding

RSL Resin ..... lb. .25 / .35
Resin C Pitch 55° C. M.P. .. lb. .0125/ .0135
Resin C Pitch 70° C. M.P. .. lb. .0125/ .0135
Resin C Pitch 85° C. M.P. .. lb. .0125/ .0135

Solvents

Beta-Trichlorethane ..... gal.
Bondogen ..... lb.
Carbon bisulphide ..... lb.
tetrachloride ..... lb.

Stabilizers for Cure

Laurex, ton lots ..... lb.
Stearex B ..... lb. .11½/ .12½
Beads ..... lb. .10½/ .11
Stearic acid, single pressed. lb. .11½/ .12½
Stearite ..... 100 lbs. 10.50 /11.50
Zinc stearate ..... lb. .23

(Continued on page 88)

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)
Allow nine words for keyed address.		*Replies forwarded without charge.*

SITUATIONS WANTED

EXPERIENCED RUBBER WORKER (MIDDLE AGE) IN SMALL plant. Years of practical work on calender and mills, on mechanicals, tires and tubes, sponge rubber, and other rubber sundries. Would be a great help to superintendent to break in new help. Address Box No. 765, care of INDIA RUBBER WORLD.

WELL-KNOWN CHEMIST AND EXECUTIVE WITH MANY years of successful theoretical and practical experience in the development and production of mechanical goods, tires, pure gum and rubber thread, desires change. Can install new and profitable lines. Willing to invest some capital or take part salary from profits of new departments. Address Box No. 769, care of INDIA RUBBER WORLD.

RUBBER TECHNOLOGIST DESIRES POSITION AS SUPERINtendent or development engineer. Ten years' experience with reputable company in mechanical goods; thorough knowledge of compounding, factory development, and production. Capable, responsible, and good organizer. At present employed. Address Box No. 775, care of INDIA RUBBER WORLD.

PRODUCTION SUPERINTENDENT FOR MECHANICAL RUBBER goods plant, years of experience, can reduce costs and handle labor. Location in east preferred. References. Address Box No. 776, care of INDIA RUBBER WORLD.

FACTORY EXECUTIVE—20 YEARS' EXPERIENCE MANUFACturing a full line of mechanicals, both hard and soft rubber, automotive products, calendered and extruded goods. A-1 production and labor manager, with compounding knowledge and ability to train inexperienced help. Desires new connection. Address Box No. 774, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

FOR RENT

Small rubber plant located in New York City with three mills in good condition and two pot vulcanizers at a very reasonable rental. Address Box No. 771, care of INDIA RUBBER WORLD.

WE DO MILLING AND CALENDERING ON GUM STOCK. VERY reasonable. Factory near New York City. Address Box No. 772, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

ALL AROUND RUBBER MAN TO TAKE CHARGE OF A SMALL plant located in Brooklyn; must have experience in milling, spreading, curing, quarter-lining. Exceptional opportunity for the man who can produce. Address Box No. 766, care of INDIA RUBBER WORLD.

WANTED: RUBBER CHEMIST WITH TIRE COMpounding experience and fully experienced in laboratory testing procedure. For carbon black laboratory in Texas. State education, experience, and salary desired in first letter. Address Box No. 773, care of INDIA RUBBER WORLD.

ENGINEER WANTED BY LARGE EASTERN MANUfacturer. Qualified to direct, design engineering and manufacturing of Vee belts. Our organization knows of this advertisement, and replies will be held in confidence. Reply outlining qualifications and past experience in full. Address Box No. 777, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: ONE RE-CONDITIONED ROYLE 3¼" Double Reduction Spur Gear Tuber. Address Box No. 767, care of INDIA RUBBER WORLD.

FINAL LIQUIDATION OF EQUIPMENT AT MURRAY RUBBER CO., TRENTON, N. J.

1 Farrel 3-roll 66" Calender; 1 400 H.P. Tfiropp herringbone reduction gear drive; 1 250 H.P. Chain Drive; 8 Hydraulic Presses, 8" by 8" to 30" by 30"; 1 No. 4 Royle Tuber, motor drive; 1 Jacketed Vulcanizer, 4' by 6'; 1 Laboratory 2-roll Calender, 14" by 14". Miscellaneous: Compressors; Hoists; Laboratory Equipment; Magnetic Pulleys; Scales; Trucks; etc. REPRESENTATIVE ON PREMISES. ARRANGE FOR INSPECTION. PRICED LOW FOR QUICK REMOVAL. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y. Barclay 7-0600.

(*Advertisements continued on page 89*)

GENERAL

(*Continued from page 76*)

639,316. **Tire.** W. Vorwerk, Wuppertal-Barmen.
639,426. **Nipple.** J. Fromm, Berlin-Schlachtensee.
639,786. **Inner Tube Sealer.** Deutsche Kurtin-Oel-Fabriken, Neubiberg.

TRADE MARKS

United States

340,332. Representation of a star and on it the words: **"5 point."** Tire repair uncured camelback rubber stock. Fisk Rubber Corp., Chicopee Falls, Mass.
340,376. **Lace Lastique.** Corset and brassiere elastic piece goods. Artistic Foundations, Inc., New York, N. Y.
340,378. **"DD" Double Duty.** Toothbrushes. Rubberset Co., Newark, N. J.
340,425. **The "Non-Chiseled" Line.** Tire and tube portable patching kits. Bowes Seal Fast Corp., Indianapolis, Ind.
340,446. Circle containing chemical symbols. Chemical dyeing preparations and solvents for rubber. Böhme Fettchemie-Gesellschaft Mit Beschrankter Haftung, Chemnitz, Germany.
340,465. **Vulnarco.** Textile fabrics containing rubber, etc. North American Rayon Corp., New York, N. Y.
340,466. **Vulcord.** Textile fabrics containing rubber, etc. North American Rayon Corp., New York, N. Y.
340,559. **Par-Maker.** Golf balls. Crawford, McGregor & Canby Co., Dayton, O.
34,636. **Trots.** Ankle Protectors. Everlastik, Inc., Chelsea, Mass.
340,670. Ekco. Raincoats. Elmer Kreis & Co., Chicago, Ill.
340,681. Representation of a circular block containing the words: **"Neva Slip,"** with the word: **"Mallinson's"** above the block, and the words: **"Rug-Guard"** below the block. Anti-slip mats. Geo. E. Mallinson Importing Co., Inc., New York, N. Y.
340,697. Circle containing representation of a black bird and the words: **"Black Bird."** Shuttlecocks. Pennsylvania Rubber Co. of America, Inc., Jeannette, Pa.
340,760. **Drug-Pak.** Prophylactic rubber articles. Nutex Co., Philadelphia, Pa.
340-783. **Super Control.** Corsets and brassieres. Artistic Foundations, Inc., New York, N. Y.
340,808. Representation of a female figure resting on a pedestal and the words: **"Cirenet, A Circe Foundation."** Girdles, foundation garments, and brassieres. Chevette, Inc., New York, N. Y.
340,816. **Corset Clinic.** Corsets, brassieres, etc. De-An-Ay Shops, Inc., Astoria, N. Y.

New York Outside Market

(*Continued from page 77*)

Factory buying activity was at a low ebb during January. While consumption was still continuing at a regular rate, the erratic conditions in the automobile strike indicated an unsettled state; and as the decrease in world stocks appeared to have been checked in December, factories were content to buy sparingly.

Week-end closing prices on No. 1 ribbed smoked sheets follow: January 2, 21 1/16¢; January 9, 22 3/16¢; January 16, 21 7/8¢; January 23, 20 5/8¢.

New York Quotations

(*Continued from page 84*)

Synthetic Rubber

Neoprene Latex Type 50	*lb.*		
53	*lb.*		
54	*lb.*		
Type E	*lb.*		
"Thiokol" A (f.o.b. Yardville)	*lb.*	$0.35	
Coating Materials			
C-1 Series	*gal.*	5.50	
C-200 Series	*gal.*	3.75	/$4.25
D	*lb.*	.65	
Molding Powder	*lb.*	.55	/ .70

Tackifier

B. R. H. No. 2	*lb.*	.015	/ .016

Varnish

Shoe	*gal.*	1.45	

Vulcanizing Ingredients

Sulphur			
Chloride, drums	*lb.*	.03½/	.04
Rubber	100 *lbs.*	2.00	
Telloy	*lb.*		
Vandex	*lb.*		

(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky	*lb.*	.36	/ .36½
2 N.C.	*lb.*	.40	/ .41
3 N.C.	*lb.*	.37½/	.38
1 Yellow	*lb.*	.46½/	.47
2	*lb.*	.45½/	.46
Montan, crude	*lb.*	.11	/ .11½

U. S. Crude and Waste Rubber Imports for 1936

	Tons	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals 1936	Totals 1935	Balata	Miscellaneous	Waste
Jan.		29,130	1,263	597	167	65	70	..	31,292	42,059	20	870	122
Feb.		33,203	1,146	550	217	28	75	..	35,219	35,383	95	665	184
Mar.		35,675	1,296	390	35	15	40	..	37,451	44,041	60	620	142
Apr.		38,286	1,324	559	75	21	105	..	40,370	43,545	167	1,013	456
May		34,048	1,033	342	79	10	86	..	35,598	26,766	146	391	224
June		39,900	1,534	226	58	20	97	..	41,835	38,340	88	662	126
July		34,277	1,244	233	25	6	96	..	35,881	46,880	66	821	95
Aug.		40,742	1,486	50	126	12	146	..	42,562	38,655	142	523	155
Sept.		46,515	1,394	210	80	81	106	..	48,386	34,569	98	514	212
Oct.		38,508	1,980	175	42	101	114	..	40,920	34,356	21	462	149
Nov.		42,621	1,037	308	54	117	159	..	44,296	28,826	34	632	214
Dec.		54,755	1,681	374	91	14	134	..	57,049	34,596	21	462	149
Total, 12 mos., 1936	tons	467,660	16,418	4,014	1,049	490	1,228	..	490,859	.....	958	7,635	2,228
Total, 12 mos., 1935	tons	430,243	11,153	5,020	759	349	492	..	.....	448,016	725	5,958	464

Compiled from The Rubber Manufacturers Association, Inc., statistics.

United States Latex Imports

Year	Pounds	Value
1934	29,276,134	$3,633,253
1935	30,358,748	3,782,222
1936		
Jan.	3,733,665	474,682
Feb.	3,268,542	406,985
Mar.	3,196,083	417,704
Apr.	3,610,511	522,049
May	3,296,351	490,769
June	4,250,178	657,311
July	3,729,418	579,895
Aug.	3,944,962	602,992
Sept.	4,031,355	692,810
Oct.	3,117,748	500,817
Nov.	3,654,392	578,729

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Philippines and Oceania Total	Oceania	Africa	South America	Mexican Guayule	Grand Total
1934	467,400	379,400	79,100	6,500	6,300	11,100	17,700	17,700	19,600	1,004,800	1,400	3,500	9,100	400	1,019,200
1935	417,005	282,858	54,316	9,054	4,914	8,885	19,465	28,327	28,677	853,501	1,537*	5,031	12,194	459	872,722
1936															
Jan.	26,637	20,778	4,178	419	880	938	2,317	1,665	2,449	60,261	105	494	1,796	70	62,726
Feb.	19,692	27,991	3,664	871	511	529	2,107	3,663	2,894	61,922	225	620	1,177	75	64,019
Mar.	34,597	19,403	4,336	750	574	342	1,848	2,966	2,553	67,369	133	535	1,175	40	69,252
Apr.	21,667	25,255	3,172	413	817	869	2,053	1,596	2,416	58,258	92	533	1,044	103	60,030
May	34,108	22,121	2,560	632	485	517	2,354	2,077	2,281	67,135	103	493	1,018	88	68,837
June	25,115	26,401	3,766	673	553	461	1,386	3,737	2,733	64,825	153	456	947	97	66,478
July	34,214	33,911	3,773	1,048	311	1,035	1,399	3,734	2,738	82,163	155	423	1,013	96	83,850
Aug.	30,253	25,313	3,940	655	121	656	2,541	3,284	3,017	69,780	162	444	681	146	71,213
Sept.	34,160	21,835	5,367	588	76	537	1,139	3,259	3,505	70,466	164	508	1,070	106	72,314
Oct.	33,591	28,777	5,623	809	372	1,086	2,143	3,349	3,874	79,624	162	500*	1,287	114	81,687
Nov.	30,549	30,439	5,008	624	698	701	1,950	2,260	3,872	76,101	160*	550*	1,663	159	78,633

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Classified Advertisements

Continued

MACHINERY AND SUPPLIES WANTED

WANTED TO PURCHASE

One used standard 250 h.p. Rubber Mill Line Reducer Drive Unit, complete. Apply Mr. James Parker, General Delivery, Station O, Montreal, P.Q., Canada.

WANTED

A COMPLETE SET OF USED 4/8″ MEN'S RUBBER HEEL molds. One set of 5/16″ boys' whole heel eight nail molds. One set 3/8″ women's scoop six nail molds. One set 6/8″ men's eight nail whole heel molds. Address Box No. 768, care of INDIA RUBBER WORLD.

WANTED: USED BANBURY MIXERS, NUMBER 00 AND NUMber 1. Advise with full information as to condition, cost, and where they may be inspected. Address Box No. 770, care of INDIA RUBBER WORLD.

Rims Approved by The Tire & Rim Association, Inc.

Rim Size	12 Mos.,1936 No.	%	12 Mos., 1935 No.	%
Drop Center Rims, 16" Diameter and Under				
15x5.50E	1,532	0.0	10	0.0
16x4.00D	5,758	0.0	1,508,857	8.1
16x4.25D	304,987	1.5	1,093,000	5.9
16x4.50D	37,236	0.2	276,552	1.5
16x5.00E	.....	...	13,739	0.1
16x5.50E	.....	...	9,063	0.0
16x6.00E	77	0.0	.....	...
15x3.00D	40,984	0.2	8,177	0.0
15x5.00F	12,415	0.1	33,036	0.2
15x5.50F	201,024	1.0	100,118	0.5
16x3.00D	385	0.0	.....	...
16x3.50D	240,120	1.2	.....	...
16x4.00E	8,374,364	40.3	4,158,595	22.3
16x4.25E	556,641	2.7	164,588	0.9
16x4.50E	2,948,674	14.2	2,892,393	15.5
16x5.00F	917,487	4.4	242,519	1.3
16x5.50F	94,882	0.4	7,080	0.0
16x6.00F	99,055	0.5	4,926	0.0
Drop Center Rims, 17" Diameter and Over				
17x3.00D	111,544	0.5	1,146,594	6.1
17x3.25E	520,277	2.6	687,829	3.7
17x3.62F	2,185,158	10.5	2,216,842	11.9
17x4.00F	14,859	0.1	49,005	0.3
17x4.19F	4,263	0.0	21,438	0.1
17x5.00F	5,020	0.0	6,842	0.0
18x2.15B	55,971	0.3	15,854	0.1
18x3.00D	5,680	0.0	19,287	0.1
18x3.25E	9,603	0.0	14,380	0.1
18x3.62F	7,428	0.0	.....	...
18x4.00F	1,221	0.0	21	0.0
18x4.19F	20,406	0.1	14,976	0.1
19x2.15B	5,918	0.0	11,631	0.1
19x3.00D	16,430	0.1	20,443	0.1
19x3.25E	17,603	0.1	19,112	0.1
20x3.25E	17,507	0.1	10,002	0.1
21x3.25E	6,577	0.0	4,310	0.0
Flat Base Rims for Balloon Tires				
17x3.25	10,101	0.0	.....	...
17x4	1,443	0.0	1,276	0.0
17x4½	308	0.0	422	0.0
17x5	255	0.0	5,251	0.0
17x6	3,019	0.0	7,010	0.0
18x3.00D	2,442	0.0	.....	...
18x3.25E	499	0.0	1,199	0.0
18x4	1,959	0.0	1,626	0.0
18x4½	226	0.0	386	0.0
18x5	174	0.0	2,382	0.0
19x2.75D	4,536	0.0	7,473	0.0
19x3.00D	3,360	0.0	2,798	0.0
19x3.25E	.....	...	279	0.0
19x3½	262	0.0	.....	...
19x4	4,286	0.0	6,474	0.0
19x4½	2,204	0.0	1,227	0.0
19x5	701	0.0	775	0.0
19x6	.....	...	27	0.0
20x2.75D	4,937	0.0	3,726	0.0
20x3.00D	.....	...	283	0.0
20x3½	315	0.0	2,996	0.0
20x4	1,514	0.0	634	0.0
20x4½	3,617	0.0	3,552	0.0
20x5	711	0.0	12,893	0.1
20x6	.....	...	157	0.0
21x2.75	4,244	0.0	968	0.0
21x3½	8,157	0.0	11,868	0.1
21x4	933	0.0	1,221	0.0
21x4½	1,091	0.0	3,889	0.0
High Pressure Passenger Rims				
All Sizes	1,273	0.0	2,750	0.0
15" Truck Rims				
15x7	5,833	0.0	.....	...
15x8	1,135	0.0	.....	...
18" Truck Rims				
18x5	885	0.0	190	0.0
18x6	3,738	0.0	1,279	0.0
18x7	40,007	0.2	31,535	0.2
18x8	3,435	0.0	1,564	0.0
18x9/10	3,170	0.0	10	0.0
20" Truck Rims				
20x5	1,329,651	6.4	1,717,447	9.2
20x6	1,602,857	7.7	1,496,181	8.0
20x7	438,279	2.1	262,946	1.4
20x8	171,437	0.9	105,096	0.6
20x9/10	20,916	0.1	11,764	0.1
20x10.50	688	0.0	108	0.0
20x11	2,192	0.0	932	0.0
22" Truck Rims				
22x7	357	0.0	1,090	0.0
22x8	17,761	0.1	15,983	0.1
22x9/10	7,503	0.0	6,552	0.0
24" Truck Rims				
24x5	313	0.0	.....	...
24x6	2,851	0.0	2,797	0.0
24x7	12,971	0.1	11,737	0.1
24x8	19,608	0.1	20,355	0.1
24x9/10	12,499	0.1	8,505	0.0
24x11	3,696	0.0	1,965	0.0
Drop Center Tractor Rims				
24x6.00S	5,364	0.0	3,697	0.0
24x8.00T	49,191	0.2	36,753	0.2
28x6.00S	2,756	0.0	601	0.0
28x8.00T	34,056	0.2	13,569	0.1
32x6.00S	1,052	0.0	.....	...
32x8.00T	3,583	0.0	839	0.0
36x6.00S	55,258	0.3	35,996	0.2
36x8.00T	9,846	0.0	5,537	0.0
40x6.00S	6,956	0.0	950	0.0
40x8.00T	375	0.0	190	0.0
44x8.00T	426	0.0	.....	...
20x4.50E	1,030	0.0	.....	...
20x5.00F	21	0.0	.....	...
36x3.00D	607	0.0	.....	...
36x4.50E	577	0.0	.....	...
Cast Wheels				
10x5.00F	2,019	0.0	4,140	0.0
10x6.00F	585	0.0	111	0.0
24x11.25	.....	...	191	0.0
24x13Y	.....	...	7	0.0
24x15Y	508	0.0	158	0.0
Clincher Rims				
All Sizes	8,957	0.0	5,657	0.0
Airplane Rims				
All Sizes	1,590	0.0	3,163	0.0
Totals	20,790,192	...	18,664,356	...

Tire Production Statistics

	Inventory	Production	Total Shipments
Pneumatic Casings—All Types			
1934	9,454,985	47,232,748	46,686,545
1935	8,195,863	49,361,781	50,183,129
1936			
Jan.	8,916,673	4,578,179	3,874,523
Feb.	9,263,261	3,577,103	3,210,789
Mar.	9,085,790	3,637,625	3,855,527
Apr.	9,032,925	4,853,346	4,901,895
May	8,174,806	4,970,388	5,831,641
June	7,831,474	5,609,095	5,791,579
July	7,746,388	5,464,927	5,743,863
Aug.	7,793,438	5,014,415	4,976,383
Sept.	9,005,065	4,981,131	3,835,998
Oct.	10,088,510	5,123,467	4,081,023
Nov.	10,813,658	4,969,267	4,232,028
Inner Tubes—All Types			
1934	9,179,893	46,227,807	45,045,495
1935	8,231,351	47,879,034	48,066,904
1936			
Jan.	8,622,522	4,591,791	4,167,711
Feb.	8,699,228	3,556,098	3,445,767
Mar.	8,691,651	3,787,226	3,795,505
Apr.	8,788,043	4,824,199	4,746,265
May	8,719,467	4,818,960	4,918,715
June	8,104,830	5,034,595	5,503,564
July	7,724,790	5,177,430	5,758,273
Aug.	7,620,573	5,038,785	5,136,005
Sept.	8,626,648	5,160,815	4,230,546
Oct.	9,976,583	5,397,089	4,107,784
Nov.	10,732,073	4,739,267	3,994,958
Solid and Cushion Tires			
1934	34,710	197,497	187,152
1935	46,406	283,606	275,741
1936			
Jan.	40,193	25,443	22,670
Feb.	.....	14,730	17,172
Mar.	.....	16,004	21,350
Apr.	.....	32,807	32,611
May	.....	29,674	30,378
June	.....	36,856	35,617
July	.....	38,904	34,445
Aug.	.....	33,649	28,174
Sept.	.....	40,801	36,312
Oct.	.....	43,601	54,741
Nov.	.....	35,737	31,310

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires: Cotton Fabric Pounds	Crude Rubber Pounds	Consumption of Motor Gasoline (100%) Gallons
1934...	196,069,495	697,558,218	17,063,298,000
1935...	202,318,119	756,773,779	18,167,352,000
1936			
Jan....	15,987,906	61,457,999	1,367,226,000
Feb....	12,059,051	45,839,772	1,150,842,000
Mar...	13,416,664	47,872,526	1,506,582,000
Apr....	16,570,836	64,211,819	1,630,650,000
May...	17,098,812	66,119,211	1,764,294,000
June...	18,494,366	69,251,427	1,874,460,000
July...	18,250,725	69,637,586	1,961,064,000
Aug...	17,151,577	64,998,596	1,935,402,000
Sept...	16,988,854	63,671,252	1,862,532,000
Oct....	17,369,100	66,260,974	1,858,626,000
Nov...	17,612,309	67,522,693	1,676,598,000

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 1935, 81% for 1936, and 80% for previous years, with the exception of gasoline consumption.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.	Australia	Belgium	Canada	Czecho-slovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1934	439,100	158,500	9,600	9,100	28,400	11,000	50,400	59,300	21,400	69,900	47,300	60,500	964,500
1935	455,757	128,829	9,977	7,593	26,868	11,225	52,322	62,901	23,916	57,589	37,576	56,725	931,278
1936													
Jan.	33,260	4,573	1,260	760	1,758	767	6,770	5,545	1,500*	4,357	467	5,121	56,138
Feb.	33,789	1,271	735	779	1,900	344	6,288	5,257	1,000*	3,305	94	5,268	60,030
Mar.	33,743	1,227	819	1,033	1,809	410	4,342	4,568	1,000*	5,172	4,376	5,433	61,478
Apr.	44,949	2,097	969	1,097	1,079	603	4,261	5,497	1,500*	4,931	3,251	4,723	70,763
May	35,549	302	1,053	698	2,221	667	4,342	4,639	1,000*	5,531	4,220	4,380	64,602
June	35,901	1,493	1,693	579	2,042	323	4,860	5,698	1,500*	4,567	2,427	4,176	62,273
July	38,556	766	1,455	713	2,274	495	4,631	6,837	2,000*	5,126	1,733	4,532	67,586
Aug.	41,094	1,581	762	789	3,780	989	4,522	6,556	1,500*	4,305	3,128	4,259	70,103
Sept.	49,483	12	2,336	513	2,393	624	4,402	6,006	1,500*	5,197	2,922	5,159	80,523
Oct.	40,301	87	1,124	817	3,110	1,026	4,423	7,232	1,500*	6,602	2,761	5,423	74,232

* Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	October, 1936		Ten Months Ended October, 1936	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	88,643,164	$13,627,465	853,035,079	$121,679,234
Liquid latex	3,117,748	500,817	36,178,813	5,346,014
Jelutong or pontianak	1,012,705	102,485	11,691,052	1,095,618
Balata	24,086	4,815	1,070,030	172,713
Gutta percha	68,998	11,537	2,851,949	460,656
Guayule	255,600	31,489	2,096,100	205,600
Siak, scrap, reclaimed, etc.	935,696	17,328	11,052,098	242,249
Totals	94,057,997	$14,295,936	917,975,121	$129,202,084
Chicle, crude ...*Free*	87,110	$16,667	5,365,847	$1,283,589
MANUFACTURED—*Dutiable*				
Rubber tires...*number*	6,284	$3,617	66,020	323,518
Rubber boots, shoes, and overshoes ...*pairs*	8,051	697	55,829	10,032
Rubber soled footwear with fabric uppers ...*pairs*	100,573	19,946	902,684	207,051
Golf balls ...*number*	21,888	3,073	515,058	81,582
Lawn tennis balls...*number*	18,000	954	407,515	40,101
Other rubber balls...*number*	182,941	5,432	4,065,150	127,901
Other rubber toys, except balls	102,212	13,139	1,012,295	122,137
Hard rubber combs..*number*	72,490	4,202	730,770	42,895
Other manufactures of hard rubber	.....	3,227	.....	24,918
Friction or insulating tape..	62,540	3,171	298,801	15,061
Belts, hose, packing, and insulating material	.....	6,642	.....	170,096
Druggists' sundries of soft rubber	.....	9,873	.....	75,989
Inflatable swimming belts, floats, etc. ...*number*	3,948	403	656,846	35,751
Other rubber and gutta percha manufactures....*lb.*	87,239	21,904	1,217,678	227,392
Totals	.....	$96,280	.....	$1,504,424

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	1,742,307	$268,645	25,152,196	$3,978,496
Balata	18,173	4,851	204,643	54,850
Gutta percha, rubber substitutes, and scrap	2,974	815	105,916	8,579
Rubber manufactures	.....	1,912	.....	14,257
Totals	.....	$276,223	.....	$4,056,182

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,326,170	$57,603	13,125,009	$591,146
Scrap	3,134,569	47,371	35,051,192	638,156
Cements ...*gal.*	24,123	27,563	187,293	164,355
Rubberized automobile cloth *sq. yd.*	48,605	22,563	425,956	198,242
Other rubberized piece goods and hospital sheeting..*sq. yd.*	107,986	41,441	1,011,017	406,566
Footwear				
Boots ...*pairs*	5,751	11,751	60,666	132,980
Shoes ...*pairs*	12,026	7,029	194,320	79,706
Canvas shoes with rubber soles ...*pairs*	21,314	12,564	178,517	105,015
Soles ...*doz. prs.*	2,140	4,837	21,908	40,458
Heels ...*doz. prs.*	31,494	17,672	344,245	214,156
Soling and top lift sheets..	80,810	12,686	370,085	71,114
Gloves and mittens..*doz. prs.*	8,564	17,226	52,658	117,248
Water bottles and fountain syringes ...*number*	32,387	11,592	228,070	82,564
Other druggists' sundries...	.....	46,884	.....	430,415
Gum rubber clothing....*doz.*	38,628	36,472	148,808	215,390
Balloons ...*gross*	72,947	54,031	316,923	284,396
Toys and balls	.....	26,589	.....	108,100
Bathing caps ...*doz.*	2,564	3,722	53,146	86,701
Bands	21,902	8,293	198,688	71,679
Erasers	33,237	19,704	306,283	177,144
Hard rubber goods				
Electrical hard rubber goods	.....	16,347	.....	176,272
Other hard rubber goods..	.....	21,344	.....	215,835
Tires				
Truck and bus casings *number*	12,546	310,831	149,838	2,985,233
Other automobile casings, *number*	57,213	538,455	577,228	5,313,089
Tubes, auto ...*number*	41,307	68,393	514,676	796,434
Other casings and tube *number*	3,908	27,933	42,714	191,358
Solid tires for automobiles and motor trucks..*number*	474	13,900	4,172	115,261
Other solid tires	79,688	13,206	952,377	148,815
Tire sundries and repair materials	.....	84,582	.....	531,758
Rubber and friction tape....	46,788	13,592	559,465	153,544
Belts and belting	257,352	134,736	2,207,309	1,153,385
Hose	414,505	126,635	4,023,000	1,397,031
Packing	164,271	70,350	1,247,660	531,203
Mats, matting, flooring, and tiling	85,220	10,689	1,183,537	162,518
Thread	78,093	37,278	705,892	407,490
Gutta percha manufactures	98,263	24,235	839,816	223,120
Other rubber manufactures..	.....	93,657	.....	906,885
Totals	.....	$2,093,756	.....	$19,624,762

Rubber Goods Production Statistics

		1936	1935
TIRES AND TUBES*		Oct.	Oct.
Pneumatic casings			
Production	*thousands*	5,125	3,281
Shipments, total	*thousands*	4,081	3,317
Domestic	*thousands*	4,012	3,258
Stocks, end of month	*thousands*	10,089	6,715
Inner tubes			
Production	*thousands*	5,397	3,592
Shipments, total	*thousands*	4,108	3,262
Domestic	*thousands*	4,055	3,215
Stocks, end of month	*thousands*	9,977	6,523
Raw material consumed			
Fabrics	*thous. of lbs.*	21,690	14,148
MISCELLANEOUS PRODUCTS			
Single and double texture proofed fabrics			
Production	*thous. of yds.*	4,650	.....
Rubber and canvas footwear			
Production, total	*thous. of prs.*	9,751	5,874
Tennis	*thous. of prs.*	1,280	1,297
Waterproof	*thous. of prs.*	5,471	4,577
Shipments, total	*thous. of prs.*	7,897	5,733
Tennis	*thous. of prs.*	796	673
Waterproof	*thous. of prs.*	7,102	5,059
Shipments, domestic, total	*thous. of prs.*	7,844	5,705
Tennis	*thous. of prs.*	751	654
Waterproof	*thous. of prs.*	7,093	5,051
Stocks, total, end of month	*thous. of prs.*	13,430	14,700
Tennis	*thous. of prs.*	3,780	4,761
Waterproof	*thous. of prs.*	9,651	9,939

*Data for January to July, 1935, are estimated to represent approximately 97% of the industry; for August, September, October, November, and December, 1935, the coverage is estimated to be 81%.

Source: *Survey of Current Business,* Bureau of Foreign & Domestic Commerce, Washington, D. C.

Imports by Customs Districts

	—November, 1936— *Crude Rubber		—November, 1935— *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	9,823,286	$1,505,059	5,413,278	$581,074
New York	70,557,341	10,967,213	42,820,663	4,653,469
Philadelphia	1,824,183	275,753	230,273	28,194
Maryland	1,804,186	281,021	1,418,044	154,693
Georgia	178,535	27,229	.....	.....
Mobile	1,114,744	187,050	1,284,104	136,739
New Orleans	487,083	78,340	1,005,995	104,710
Los Angeles	226,000	35,605	5,857,041	698,687
San Francisco	.....	.....	327,849	36,393
Ohio	231,313	28,862	46,787	4,869
Colorado	156,800	25,281	.....	.....
Totals	86,403,471	$13,411,413	58,404,034	$6,398,828

*Crude rubber including latex dry rubber content.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
†2,173	Automobile and truck tires	Guatemala, Guatemala
*2,226	Old automobile tires	Tunis, Tunisia
†2,227	Thread for making elastic tissue	Marseilles, France
†2,228	Automobile and truck tires and tubes	Egido, Venezuela
†2,254	Rubber goods	Bombay, India
†2,269	Druggists' sundries	Brussels, Belgium
*2,282	Rubberized cloth	Nottingham, England
†2,299	Druggists' sundries	Panama City, Panama
*2,305	Sponge rubber based linoleum	London, England
†2,307	Rubber goods	Bombay, India
†2,332	Molded rubber battery cases	Buenos Aires, Argentina

*Purchase. †Agency.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2236	Manufacturer of Airline rubber plugs.
2237	Manufacturer of Saunders valves.
2238	Supplier of composition soft rubber suitable for casting in plaster of Paris molds.
2239	Manufacturer of rubber frames for goggles.
2240	Manufacturer of rubber ear stopple that renders the user temporarily deaf.
2241	Buyer of worn-out automobile casings.
2242	Manufacturer of ¼-inch thick rubber or rubber composition with smooth surface over live rubber, that can be molded in any color.
2243	Manufacturer of aluminum glove forms.